

## **Development of digital literacy picture book knowledge training critical thinking in third grade students**

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**Abstract:** *Teachers require technology-based learning media to improve student engagement in learning. This study was motivated by the finding that some students had reading difficulties, which reduced comprehension of materials and hindered achievement of objectives. To solve this problem, digital media was developed as a solution. The research used the ADDIE model and involved third grade elementary students in Malang. Research instruments included questionnaires for student and teacher responses and tests validated by media, language, and subject experts. Data were collected through interviews and observations, then analyzed using qualitative and quantitative approaches. The purpose of this study was to examine the feasibility, practicality, and effectiveness of a digital literacy picture book. The findings showed that the developed media was very feasible, practical, and effective. The implication is that digital literacy picture books can serve as an alternative to foster student engagement and critical thinking, especially for learners with reading difficulties.*

**Keywords:** *Picture Book Knowledge; Digital Literacy*

### **Introduction**

Learning is an activity needed by every individual, both students and the general public, to develop the knowledge they possess, including behavioral and attitudinal knowledge. In general, the purpose of learning is an effort to understand many things in order to broaden one's knowledge. According to Ahdar and Wardana (2019), Festiawan (2020), as well as Pane and Dasopang (2017,) learning is a basic need for every individual, because humans are required to possess knowledge that will be useful throughout their lives. Learning activities are not only limited to reading, writing, listening, doing assignments, or taking exams, but also include behavioral changes that occur during the learning process. Learning is an effort made by individuals to change behavior through meaningful learning experiences by taking positive values from the various materials that have been studied, whether in the form of knowledge, skills, or attitudes.

The learning process is an activity carried out to deliver information through learning materials, and it is usually conducted by students and teachers in order to realize the teaching and learning process. According to Ifan (2019), Nurhayani et al. (2024), and Wibowo and Farnisa (2018), the learning process is one of the efforts to improve the quality of education, the implementation of which may change in accordance with the curriculum established by the government. The success of education is greatly influenced by the teacher's ability to manage and facilitate the learning process. Teachers need to have the skills to convince students of the importance of learning. To achieve effective and engaging learning objectives,

teachers can apply various learning methods. Effective learning requires adequate facilities and infrastructure. Learning media serve as tools to assist in delivering material so that the learning process becomes more effective. These media can be in the form of concrete or abstract objects, adjusted to the teacher's needs in increasing students' learning interest.

Technology today has become a necessity for everyone, from children to adults. Its use is very widespread, allowing people to obtain information quickly. Technology can have both positive and negative impacts on individuals, depending on how it is utilized and how wisely information is filtered. Technology can be used in the field of education as a means to create learning that is engaging, enjoyable, and meaningful. Ahsani et al. (2021), Dewi et al. (2021), and Heryani et al. (2022) technology plays an important role in improving students' digital literacy skills through the development of technology-based learning media. Digital literacy is one of the forms of technological advancement in the 21st century, characterized by the ease and speed of accessing information widely. This concept can be implemented in the field of education through the use of instructional media. Digital literacy contributes to sharpening students' reading skills, while the use of technology provides interactive learning experiences through the ability to access information. In the educational context, digital literacy also influences students' motivation to develop their creativity.

Based on the results of observations and interviews with the teacher, it was found that several students still have low reading and critical thinking skills, such as being unable to read and unable to understand the content of a text. As a result, during activities that require critical thinking, students have difficulty understanding the material and filtering information properly. This becomes an obstacle for the teacher in achieving the learning objectives. The learning media most often used by the teacher in science (IPA) lessons are digital media such as PowerPoint presentations, reading journals, and printed books as teaching resources.

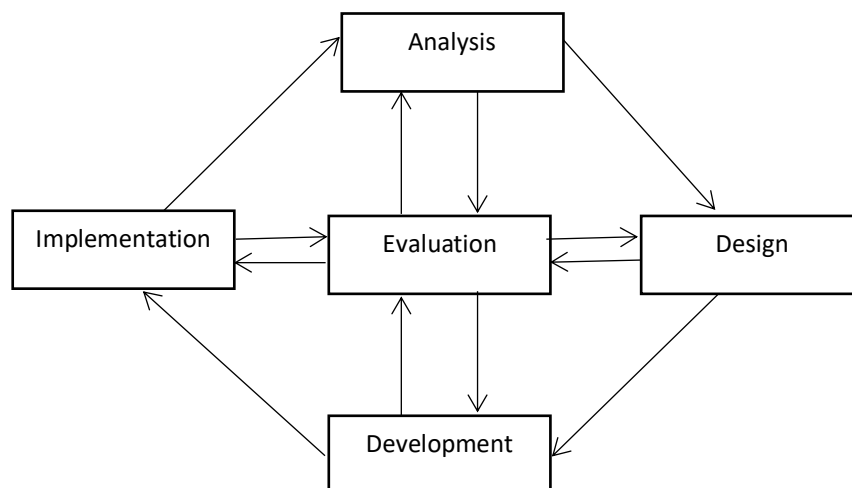
Previous research was conducted by Sari et al. (2020) it produced a Picture Book Knowledge (PBK) product in the form of a printed book containing material on animal reproduction, with the aim of fostering students' learning interest so that the material could be easily understood. In its implementation, it was not directly tested on students; instead, the developed media was tested on a sixth-grade teacher at SDN Druju 4. Digital picture book media is a learning medium that can improve students' learning outcomes. Ardhiniswari et al. (2020). Digital picture storybooks can improve students' speaking skills in expressing their opinions during the learning process using the Indonesian language Putri et al. (2023). Digital picture storybooks can foster students' character, although they have limitations in that they can only enhance one specific character, which focuses on students' responsibility Sari and Wardani (2021).

Unlike previous studies, which generally developed picture books in printed form or digital picture books containing only conversational material, this study introduces an innovation in the form of a more interactive digital literacy-based Knowledge Picture Book. The developed media presents text and images that are not in the form of moving animations, but are equipped with page transition effects when swiped, making it attractive to readers, especially children. In addition, this media is equipped with audio features, videos, and evaluation links that can be accessed directly via digital devices. The presence of an audio

feature allows students who have difficulty reading to understand the material more easily, because they can click the sound icon to listen to the content while observing the images presented. The appearance and learning experience offered by this media are different from both conventional printed books and digital books that have been developed in previous studies. Although both are digital, this media has advantages in terms of interactivity and completeness of features. Some previous studies still showed limitations in embedding videos, audio, and hyperlinks, whereas this media is able to optimally integrate all three elements and can be shared online. The Book Creator platform was chosen because it supports ease in designing engaging and accessible digital learning media. Through this study, it is expected that the developed media can improve students' critical thinking skills and strengthen reading ability through a technology-based and digital literacy approach.

## Method

This study uses the Research and Development (R&D) method with the ADDIE model, which consists of: (1) the Analysis stage, including curriculum analysis implemented in the school, students' constraints, teachers' constraints, and the required solutions; (2) Design, in which the learning media are designed according to the needs, including background, pictures, colors, and reading texts; (3) Development, which is the stage of creating the digital literacy-based picture book knowledge media that has passed the design stage and validation by experts, namely a subject-matter expert, a language expert, and a media expert, to determine its validity; (4) Implementation, which is the trial stage carried out in a third-grade class at an elementary school in Malang City by taking a sample of 10 students to determine the practicality and effectiveness of the developed media; and (5) Evaluation, which is conducted to obtain feedback from respondents regarding the developed media with the aim of refining the learning media created.



**Figure 1.** ADDIE Development Design Stages Diagram

Source: Slamet (2022)

The specifications of the digital literacy-based Picture Book Knowledge product were developed as an interactive learning medium that functions as supplementary learning material to support the delivery of lessons by teachers in an engaging and effective manner. This media takes the form of a virtual book in portrait format equipped with visual and audio elements such as a cover, user instructions, illustrations, sound, video, and an evaluation at the end of the material. The topic presented in this media is titled "Let's Get to Know the Animals Around Us," and it is designed to be accessible through digital devices such as mobile phones or computers, either individually or in groups. The aim is to encourage students to make wise use of technology as a fun learning tool.

Media validation was carried out by a subject-matter expert who assessed two main aspects, namely content and ease of use (Gusti & Indra Martha Rusmana, 2020). The content aspect measures the clarity of concepts, the structure of the material, its suitability for students, as well as the relevance of the material, illustrations, and learning objectives. Meanwhile, the ease of use aspect evaluates the effectiveness, completeness, attractiveness, and ease of understanding of the media.

Expert validation of media focuses on content and presentation by analyzing several indicators within two aspects, namely content and presentation (Gusti & Indra Martha Rusmana, 2020). The content aspect includes the clarity of the material and its suitability with students' developmental levels. The presentation aspect covers display quality, ease of use, as well as audio-visual elements that support students' understanding.

The language expert validation assessed language use based on its appropriateness for children's developmental level, clarity of sentence structure, use of punctuation, and its ability to enhance students' reading interest and comprehension (Gusti & Indra Martha Rusmana, 2020).

The practicality of the media was assessed through questionnaires completed by both teachers and students. Students evaluated the appearance (text and images), presentation of the material (clarity and ease of understanding), and the benefits of the media (ease of learning and attractiveness) Widiastika et al., 2020. Teachers assessed the implementation of the media in learning, its effectiveness, time efficiency, alignment with the curriculum, as well as the appearance and content of the media. All of these evaluations aim to ensure that the developed Picture Book Knowledge media is feasible and practical, so that it can support the effectiveness of the learning process Khusnah et al., 2020.

This study employed both quantitative and qualitative methods to assess the overall feasibility, practicality, and effectiveness of the media. Quantitative data were collected through questionnaires distributed to subject-matter experts, media experts, teachers, and students. The questionnaires used a Likert scale with five categories: (1) very poor, (2) poor, (3) fair, (4) good, and (5) very good. The data from the questionnaires were then processed using percentage formulas to obtain an overview of the results.

The feasibility assessment of the learning media was conducted using the formula from Gumilang et al. (2019), namely  $AP = (\text{Actual Score} / \text{Ideal Score}) \times 100\%$ . This formula is based on the theory that feasibility can be quantitatively measured by comparing the actual results obtained with the ideal criteria determined, so that the level of feasibility can be categorized systematically. The actual score refers to the total value given by the validators, while the ideal score is the maximum value obtained from the number of items multiplied by the maximum score per item.

To assess the practicality of the media, the formula from Septyaningrum et al. (2023) was used, namely  $\text{Score} = (\text{Obtained Score} / \text{Maximum Score}) \times 100\%$ . This formula refers to the theory that practicality is assessed through the ease and efficiency of media use, which can be quantified by comparing the scores obtained with the maximum possible score. Based on the results of the percentage calculations, the feasibility and practicality of the media are categorized into five levels: very feasible/very practical (81–100%), feasible/practical (61–80%), fairly feasible/fairly practical (31–60%), less feasible/less practical (21–40%), and not feasible/not practical (0–20%), as described by Gumilang et al. (2019) and Septyaningrum et al. (2023).

The effectiveness of the media was obtained based on the results of students' pretests and posttests. The improvement in students' learning outcomes was measured using the N-Gain test formula from Sukarelawan et al. (2024), namely  $N\text{-Gain} = (\text{Posttest Score} - \text{Pretest Score}) / (\text{Ideal Score} - \text{Pretest Score})$ . This is in line with the theory that learning effectiveness can be evaluated by measuring the increase in students' achievement through pretest and posttest comparisons. The N-Gain values were then categorized into five levels: high ( $\geq 0.70$ ), moderate ( $0.30 - < 0.70$ ), low ( $0.00 - < 0.30$ ), no improvement ( $g = 0.00$ ), and a decrease ( $-1.00 \leq g < 0.00$ ).

Qualitative data in the form of notes, suggestions, and feedback from experts were used to refine the developed media. By combining this qualitative data with quantitative data, the research analysis ensured that the resulting media was not only valid in terms of content and appearance, but also practical and effective in improving students' learning outcomes.

## Results and Discussion

The ADDIE model in development research consists of five stages, namely: (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation. In the development process of this study, a digital literacy-based Picture Book Knowledge learning media was produced.

In the analysis stage, initial data collection was carried out through interviews with the teacher to obtain information related to the difficulties experienced by teachers and students in implementing critical thinking activities and achieving learning objectives. Based on the analysis results, it was found that third-grade students were unable to read, which affected the learning process, especially during critical thinking activities. From the problems identified, it was concluded that a learning medium is needed that can help students understand the material with the support of video and audio.

Based on the analysis results, a digital literacy-based Picture Book Knowledge learning media was designed to train critical thinking skills, equipped with the material “Let’s Get to Know the Animals Around Us,” along with images, audio, video, and an attractive display to motivate and facilitate students’ learning. The media was first designed using Canva and then developed using Book Creator.

The learning objectives in this study are aimed at developing students’ ability to identify the characteristics and functions of animal body parts and their relationship with habitats. The achievement of these objectives is measured through several indicators, including students’ ability to recognize animal characteristics and habits through images and descriptive puzzles, analyze problems related to the functions of body parts and animal habitats based on reading texts, solve the identified problems, and conclude cause-and-effect relationships as well as provide solutions based on text analysis. These indicators are designed to comprehensively assess students’ critical thinking skills within the context of learning about animals.

The results and discussion section contains research findings obtained from the research data and hypotheses, a discussion of the research results, and a comparison with similar theories and/or similar research. The results and discussion section can be divided into several sub-sections.



Figure 2. Book Creator

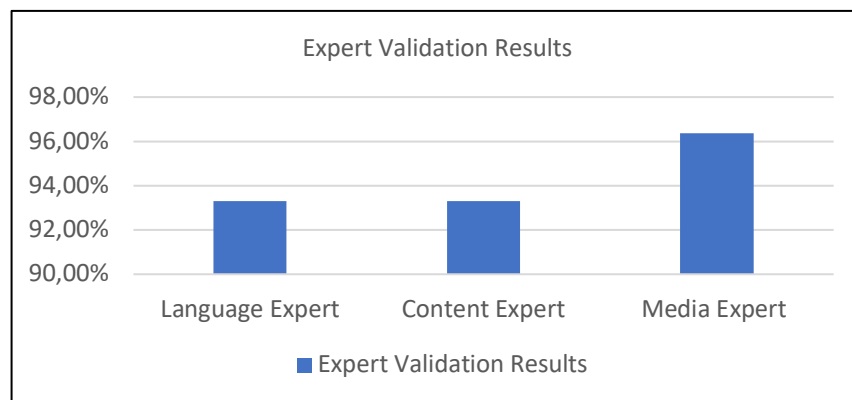
The development stage is the step of creating the digital literacy-based Picture Book Knowledge media that has gone through the design phase using Canva. In the next step, the media is developed using Book Creator by creating slides and inserting images that were previously designed in Canva, as well as adding audio, videos, and evaluation links. In this stage, the researcher also collaborated with experts, namely a media expert, a subject-matter expert, and a language expert in order to produce a better learning media. The completed product was then shared in the form of a link to be accessed by users.



The implementation of the digital literacy-based Picture Book Knowledge media was tested on third-grade students to determine the effectiveness and practicality of the developed product. The practicality test results can be seen from the ease of use reported by both the teacher and the students, while the effectiveness can be seen from the assessment of students' learning outcomes after using the media.

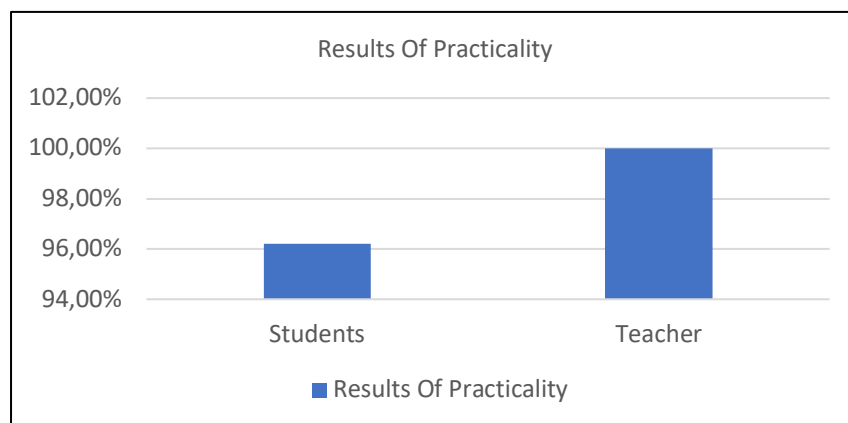
Evaluation was conducted to obtain responses and feedback from both teachers and students toward the implemented media, with the purpose of improving the developed learning media. Evaluation was also carried out by analyzing the data obtained from expert validation results, as well as effectiveness and practicality trials. Based on the evaluation results, the digital literacy-based Picture Book Knowledge media was declared effective in improving students' critical thinking skills, indicating that the developed media had a positive impact on the success of the learning process, and therefore was considered highly feasible for use.

The final stage after developing the digital literacy-based Picture Book Knowledge media is the validation phase, which is carried out by a subject-matter expert, a language expert, and a media expert. The following are the validation results provided by the language expert.



**Figure 3.** Validation Results by Experts

To determine the practicality of the digital literacy-based Picture Book Knowledge media after its implementation to students and the teacher's responses, the results were obtained as follows:



**Figure 4.** Teacher and Student Responses.

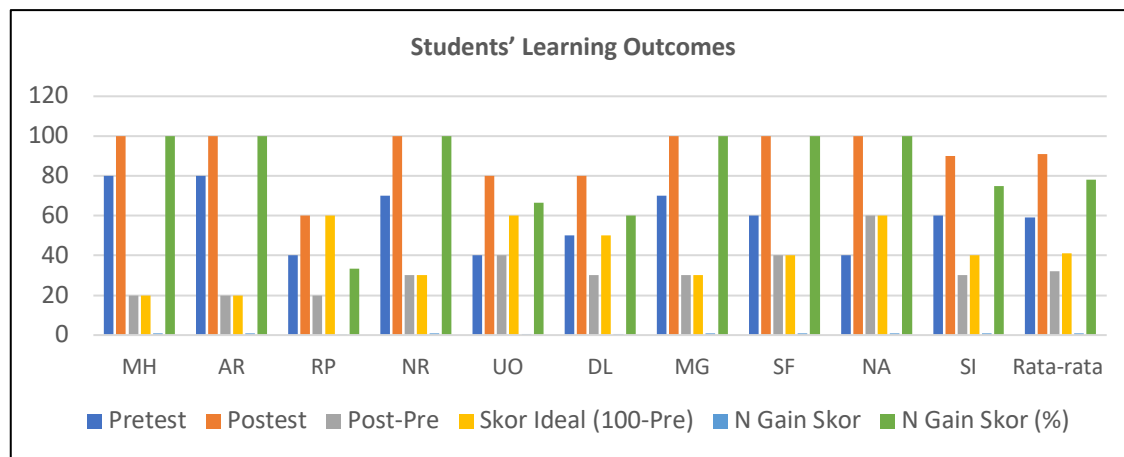


Figure 5. Students' Learning Outcomes

Based on the diagram above, it is shown that the use of the digital literacy-based Picture Book Knowledge media is effective for learning, with an N-Gain score of 0.78 and an N-Gain percentage of 78%, which falls into the high category.

The digital literacy-based Picture Book Knowledge media on the material "Let's Get to Know the Animals Around Us" was validated by the subject-matter expert with a score of 93.3%, which falls into the "very good" category. This shows that the material meets learning standards. The language aspect also received a score of 93.3%, indicating that the language used is appropriate for students' developmental level, easy to understand, and in accordance with Indonesian language rules. Meanwhile, the media aspect obtained a score of 96.36% with a "highly feasible" category, showing that the media is easy to use and has overall good quality. Hutabri (2022), Fitria et al. (2017), Asri and Dwiningsih (2022) validity is used to measure how accurately an instrument performs its function or task, thus ensuring that it is appropriate for use. The level of validity of a media is determined based on the results of analyses referring to criteria that have been previously established, such as by using questionnaires given to experts to evaluate the feasibility of the media. Expert validation aims to assess the quality of the developed learning media so that it can be declared feasible for use and of good quality.

The practicality of the media was measured through responses from the teacher and students. Based on the data obtained, the teacher gave a score of 100%, and the students gave 96.2%, so the media was categorized as highly practical. The assessment was conducted using questionnaires that covered aspects such as attractiveness, ease of use, compatibility with the curriculum, and effectiveness when used in learning. Irawan and Hakim (2021), Kumalasani (2018), and Revita (2019) the practicality of a learning medium is determined through assessments from its users. The level of practicality can be observed from the responses of teachers, students, or related parties regarding the ease of delivering learning material and how effectively the media can be used. This assessment aims to ensure that the developed media does not make it difficult for users to understand the material. Feedback from teachers and students is very important, not only for evaluating the practicality of the media but also as input for its improvement during the development process. To measure the practicality of a learning medium or learning device, a practicality questionnaire is used,



completed by teachers and students, with the aim of obtaining information regarding the degree of practicality based on the teachers' views as practitioners and the students' experiences as users.

The results of the trial of the digital literacy-based Picture Book Knowledge learning media showed that it was effective in helping students develop critical thinking skills and facilitated comprehension of the material for students who have limitations in reading. The results indicated effectiveness, with a score of 0.78, which falls into the high category as analyzed using the N-gain score. As in the study conducted by Rosida et al. (2017), Arisetya (2022), Sanjaya (2023) and (Agustina et al., 2024), interactive electronic books have a higher potential to enhance students' academic achievement compared to ordinary printed books. This is primarily because digital media can present multimedia elements such as animations, audio, and videos that can improve students' understanding, engagement, and motivation to learn. Interactive digital books have been proven to be quite effective in developing students' critical thinking skills, therefore teachers are encouraged to use digital books as teaching materials in science learning. This digital book media is highly effective in increasing students' participation, learning motivation, creativity, and learning outcomes. Digital books are interactive learning media that present text, images, audio, and video, thereby creating a more engaging and easily understandable learning experience. Their advantage lies in the ability to stimulate curiosity, foster critical thinking, and develop students' intellectual aspects through richer representations of the material. With these multimedia elements, students are not only receiving information but are also encouraged to analyze, interpret, and evaluate the knowledge they acquire.

## Conclusion

Based on the findings of this study, it can be concluded that the digital literacy-based Picture Book Knowledge has a significant impact on students' learning outcomes. The development of the digital literacy-based Picture Book Knowledge showed excellent results as indicated by the validation scores from the media expert, material expert, and language expert. The level of practicality was obtained from the responses of teachers and students, showing that the media was highly practical. In terms of effectiveness, the media achieved a high score. This indicates that the developed media meets the categories of highly practical, highly feasible, and effective. The researcher hopes that teachers can take advantage of technology by developing similar learning media to be implemented for students as a facility to support the learning process. Future researchers are also expected to develop digital learning media with more complete features such as animations, since the media developed in this study had limitations in adding animated elements.

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