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Heyzine Flipbook Based E-Book for Enhancing Students' Critical Thinking Skills of Junior high school: A Study Development

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Abstract: This study aimed to analyze the effectiveness of a Heyzine Flipbook-based e-book in improving students' critical thinking skills in Pancasila Education learning. The research employed a quasi-experimental design using a nonequivalent control group design. The participants consisted of two classes: an experimental class that used the Heyzine Flipbook-based e-book and a control class that used conventional textbook media. The results showed that the mean posttest score of the experimental class (83) was higher than that of the control class (60). The average N-Gain score of the experimental class was 0.66 (moderate category), while the control class obtained 0.27 (low category). The independent sample t-test indicated a significance value of $p < 0.05$, demonstrating a statistically significant difference between the two groups. Furthermore, the effect size was categorized as large, indicating that the Heyzine Flipbook-based e-book had a strong impact on enhancing students' critical thinking skills. Therefore, the Heyzine Flipbook-based e-book was effective as an alternative digital learning medium to support the development of students' critical thinking skills.

Keywords: Critical thinking skills; Digital learning e-book; Heyzine flipbook

Introduction

The rapid development of the modern era requires the education sector to continuously innovate in order to produce high-quality human resources. Schools are no longer sufficient to focus solely on content delivery; instead, they must foster students' ability to understand information, process it logically, and apply it to solve various problems in social and civic life. Education therefore plays a strategic role in preparing a generation that is adaptive to change, possesses strong character, and is capable of facing global challenges (Mancone et al., 2024). The advancement of information technology has significantly influenced the learning process in schools, including in Pancasila Education. The integration of technology into learning enables teachers to create more varied, interactive, and meaningful learning experiences. Twenty-first-century education emphasizes higher-order thinking skills, information literacy, and the effective integration of technology to meet students' needs (Smith et al., 2020; Smith & Storrs, 2023; Trilling & Fadel, 2010). The use of technology-based learning media has therefore become an important strategy to improve the quality of Pancasila Education in a contextual and meaningful manner (Kumar et al., 2023). At the junior high school level, Pancasila Education should not merely emphasize conceptual mastery but also encourage students to analyze social issues, formulate positions, and reflect on Pancasila values in daily life. Student-centered learning requires instructional media capable of stimulating critical thinking through meaningful and challenging content. However, preliminary observations conducted at SMP Negeri 4 Sumberjambe Jember revealed that instruction was still dominated by lecture methods, with printed textbooks serving as the primary learning resource. The utilization of digital learning media remained limited, resulting in suboptimal classroom interaction. Consequently, students tended to be passive and encountered difficulties in completing tasks

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requiring analytical reasoning skills (Yamada et al., 2024).

Limited variation in instructional media influences students' engagement and learning motivation. Empirical findings indicate that interactive and relevant digital media increase student participation and active involvement in the learning process (Kulkarni et al., 2025; Ohn et al., 2022). Strong learning engagement contributes significantly to the development of critical thinking skills. Conceptual understanding also serves as a key indicator of successful Pancasila Education learning. Understanding extends beyond the ability to recall concepts; it involves the capacity to relate Pancasila values to real-life situations, explain them independently, and apply them in daily practice. Such understanding reflects higher-level cognitive processes, including analysis and deep information processing (Berre et al., 2025; Lafendry, 2023). The need for innovative learning media that align with junior high school students' characteristics is therefore evident. A potential alternative is the development of a Heyzine Flipbook-based e-book. This medium facilitates the presentation of instructional materials in an interactive digital format enriched with illustrations, contextual videos, and analytical exercises, thereby promoting active engagement and enhancing critical thinking skills (Ohn et al., 2022).

Previous studies demonstrate that digital learning media help address issues related to low engagement and limited understanding. Digital platforms enable more attractive delivery of instructional content through the integration of text, visuals, audio, and contextual video materials. Interactive e-books and digital flipbooks have been reported to effectively enhance critical thinking skills by embedding analytical and evaluative activities within digital content (Octaviana et al., 2025; Velinda et al., 2024). Furthermore, digital flipbooks contribute to the development of twenty-first-century competencies, including critical thinking, through integrated visual elements and interactive navigation features (Purnomo et al., 2024). Flipbook-based e-modules developed using problem-based learning approaches have also been shown to strengthen students' analytical reasoning and decision-making skills (Solehah et al., 2025). Interactive e-books have likewise been found to improve critical thinking indicators such as interpretation, analysis, evaluation, and inference (Reftiyana & Susantini, 2025). Based on these considerations, this study focused on developing a Heyzine Flipbook-based e-book for Pancasila Education at SMP Negeri 4 Sumberjambe Jember as an effort to enhance students' critical thinking skills. The research questions were formulated as follows: How was the Heyzine Flipbook-based e-book developed for Pancasila Education to enhance students' critical thinking skills at SMP Negeri 4 Sumberjambe Jember, how effective was the Heyzine Flipbook-based e-book in improving students' critical thinking skills in Pancasila Education at SMP Negeri 4 Sumberjambe Jember? This study therefore aimed to develop the Heyzine Flipbook-based e-book and examine its effectiveness in improving students' critical thinking skills.

Method

This study employed a Research and Development (R&D) approach, as it aimed to develop a learning medium in the form of a Heyzine Flipbook-based e-book and to examine its effectiveness in improving junior high school students' critical thinking skills (Nursamssu et al., 2023). Development research is defined as a systematic process conducted to produce learning products that are valid, practical, and effective, and that can be scientifically justified (Branch, 2009; Nurhikmah et al., 2021; Sukmadinata, 2009). The development model applied in this study was the ADDIE model, which consists of five main stages: Analyze, Design, Development, Implementation, and Evaluation (Filivani & Agung, 2021). The ADDIE model was selected because it is systematic, flexible, and easily implemented in digital learning media development, and it accommodates evaluation processes at each stage of development (Branch, 2009; Sakdiah et al., 2025). This model served as a guideline in designing and developing effective learning media aligned with students' needs.

This study was conducted at SMP Negeri 4 Sumberjambe, Jember Regency. The research population consisted of all seventh-grade students, totaling 180 students (Syukri et al., 2025). The sample was determined using purposive sampling by considering the equivalence of students' initial abilities. The research sample consisted of two classes: Class VII A as the experimental class with 30 students and Class VII B as the control class with 30 students (Hidayah et al., 2021). During the media development stage, the study applied the R&D approach. Meanwhile, during the effectiveness testing stage, a quasi-experimental design was employed using the Nonequivalent Control Group Design (Larassati & Rachmadiarti, 2021). This design involved two groups: an experimental group that received treatment through learning using the Heyzine Flipbook-based e-book and a control group that used conventional learning media in the form of textbooks (Hutauruk & Rosana, 2025).

The first stage was the Analyze stage, which was conducted through observations of Pancasila Education learning activities at school, interviews with subject teachers, and literature reviews. This stage aimed to identify learning needs, student characteristics, and problems encountered during the learning process, particularly those related to students' critical thinking

skills. The second stage was the Design stage, which included storyboard preparation, visual layout design of the e-book, organization of material structure, and development of critical thinking skills assessment instruments (Sofa & Indana, 2022). At this stage, the media design was adjusted to junior high school students' characteristics and learning principles that support the development of critical thinking skills.

The third stage was the Development stage, which involved developing the e-book using Canva and publishing it through the Heyzine Flipbook platform. The developed media were then validated by material experts and media experts to assess content feasibility, visual appearance, language, and usability before being implemented in learning activities (Mariyah et al., 2025).

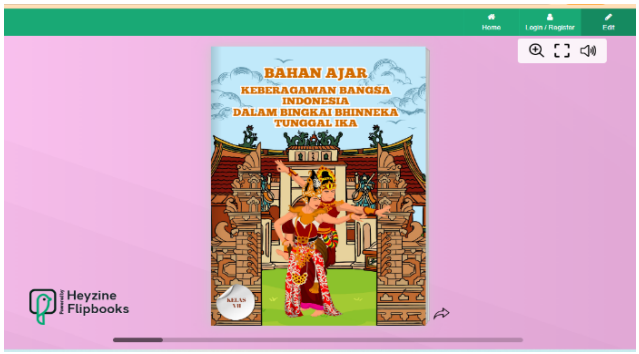

Figure 1. Cover display of the Heyzine flipbook-based e-book

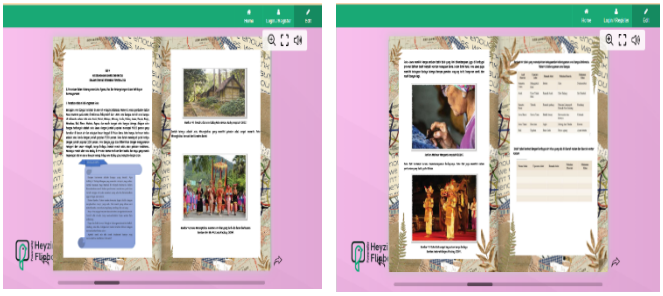

Figure 2. Example of material page

The fourth stage was the Implementation stage, which involved testing the learning media in the experimental class. At this stage, students were given a pretest before learning activities, followed by learning using the Heyzine Flipbook-based e-book, and ended with a posttest to measure improvements in students' critical thinking skills. Meanwhile, the control class participated in learning activities using conventional learning media (Merkle et al., 2022). The fifth stage was the Evaluation stage, which aimed to assess the feasibility and effectiveness of the developed e-book. Evaluation was conducted based on expert validation results, student responses to the learning media, and improvements in students' critical thinking skills. The research data consisted of qualitative and quantitative data. Qualitative data were obtained from expert validation results and student response questionnaires, while quantitative data were obtained from pretest and posttest results of critical thinking skills. Quantitative data analysis was conducted using N-Gain calculation to determine improvements in students' critical thinking skills, while qualitative data were analyzed descriptively (Fauzi et al., 2023).

Result and Discussion

Result

Material expert validation was conducted to assess the feasibility of the Heyzine Flipbook-based e-book content in terms of material substance, language, and suitability with junior high school students' characteristics. The assessed aspects included the alignment of material with Learning Outcomes (CP) and Learning Objectives (TP), accuracy of concepts and facts, breadth and depth of material, integration with real-life contexts, clarity of presentation, accuracy of terminology, language clarity, suitability with student characteristics, support for critical thinking, and alignment of evaluation with the material.

Table 1. Material expert validation results

Assessment Indicator	Maximum Score	Obtained Score
Suitability of material with CP and TP	4	4
Accuracy of concepts and facts	4	3
Breadth and depth of material	4	3
Integration of material with real-life context	4	4
Clarity of material presentatio	4	3
Accuracy of terminology usage	4	4
Clarity of language and sentences	4	3
Suitability of material with junior high school student characteristics	4	4
Support of material for critical thinking	4	4
Suitability of evaluation with material	4	3
Total	40	34

Feasibility Calculation

$$\text{Percentage} = \frac{34}{40} \times 100\% = 85\%$$

Category: Very Feasible

Based on Table 1, the material expert validation results showed a feasibility percentage of 85%, categorized as very feasible. These results indicate that the presented material is aligned with learning outcomes, conceptual accuracy, language clarity, and supports the development of students' critical thinking skills. These findings are consistent with studies on instructional material and e-book development requiring feasibility/validity percentages ≥ 75% or categorized as valid/very valid for learning media to be considered appropriate for digital or face-to-face

learning (Azizah et al., 2021; Susantini et al., 2021). In addition, material support for critical thinking development and evaluation alignment with competency indicators are considered essential in educational instruments assessing higher-order thinking skills and students' critical thinking (Rintayati et al., 2021; Sarwanto et al., 2021).

Media Expert Validation Results

Media expert validation aimed to assess visual appearance, navigation, interactivity, and ease of use of the Heyzine Flipbook-based e-book media.

Table 2. Media expert validation results

Assessment Indicator	Maximum Score	Obtained Score
Visual design attractiveness	4	4
Layout and typography suitability	4	3
Image and illustration quality	4	4
Design consistency between pages	4	3
Ease of navigation	4	4
Media interactivity	4	3
Multimedia integration (video, link)	4	3
Clarity of usage instructions	4	4
Suitability with student characteristics	4	4
Stability and ease of access	4	3
Total	40	34

Feasibility Calculation

$$\text{Percentage} = \frac{34}{40} \times 100\% = 85\%$$

Category: Very Feasible

Based on Table 2, media expert validation results showed a score of 34 out of 40 or a feasibility percentage of 85%, categorized as very feasible. In the visual aspect, design attractiveness, image/illustration quality, and suitability with student characteristics obtained high scores. This aligns with findings that visual design (color, layout, media) is a key attribute influencing perceived ease of use and usefulness in e-learning environments (AL-Sayid & Kirkil, 2023; Younas et al., 2021). Navigation, interactivity, multimedia integration, and access stability were also categorized as good to very good, supporting the principle that interactivity, navigation ease, and system quality are important factors in building user intention to continue using digital learning media (Mailizar et al., 2021). These results are consistent with e-book development studies showing that products are considered valid/feasible when expert assessment percentages exceed certain thresholds (≥ 75%) and are supported by attractive design, ease of understanding, and positive user responses (Zardari et al., 2021). Thus, the Heyzine Flipbook-based e-book can be categorized as very feasible for junior high school learning media.

Pretest, Posttest, and N-Gain Results of the Control Class

Table 3. Average of control class

Average Pretest	Average Posttest	Average N-Gain	Category
45	60	0.27	Low

Maximum score = 100
N-Gain Formula:

$$g = \frac{\text{Posttest} - \text{Pretest}}{100 - \text{Pretest}} \quad (1)$$

N-Gain Criteria:
$g \geq 0.70$ (High)
$0.30 \leq g < 0.70$ (Medium)
$g < 0.30$ (Low)

Based on the research results, the average pretest score of the control class was 45, categorized as low. This indicates that before learning, students' critical thinking skills were still not optimal. After learning using conventional textbook media, the average posttest score increased to 60, indicating improvement but not yet significant. The average N-Gain value of 0.27 falls into the low category, indicating that conventional text-based learning has not been effective in significantly improving students' critical thinking skills. These findings are consistent with research results showing that control classes using conventional learning methods tend to have low N-Gain scores in improving critical thinking skills compared to classes using innovative learning approaches or media (Nurhidayah et al., 2025). This result is also supported by findings indicating that traditional learning often provides limited improvement in critical thinking without interactive or innovative learning media (Noor et al., 2025).

Pretest, Posttest, and N-Gain Results of the Experimental Class

Table 4. Average of experimental class

Average Pretest	Average Posttest	Average N-Gain	Category
50	83	0.66	Medium

Compared to the control class, the experimental class average pretest score was 50, categorized as medium. After treatment using the Heyzine Flipbook-based e-book, the average posttest score increased significantly to 83. The average N-Gain value of 0.66 falls into the medium category. In addition, several students obtained posttest scores ≥ 90, indicating that the e-book media not only improved overall learning outcomes but also optimized critical thinking skills among high-achieving students. These findings are consistent with studies indicating that interactive digital teaching materials effectively improve critical thinking skills by increasing student engagement and learning activity (Cahyono et al., 2024).

Overall, the Heyzine Flipbook-based e-book media proved to be more effective than conventional learning in improving students' critical thinking skills.

t-Test and Effect Size Results

Table 5. Posttest descriptive statistics

Class	N	Mean	Std. Deviation
Experimental (VII A)	30	83	4.8
Control (VII B)	30	60	3.6

Independent t-Test

Null hypothesis (H_0): There is no difference in critical thinking skills between the experimental and control classes.

Alternative hypothesis (H_1): There is a difference in critical thinking skills between the experimental and control classes.

Table 6. t-Test results

Statistic	Value
t-count	21.02
Sig. (2-tailed)	0.000
α	0.05

The significance value of 0.000 < 0.05 indicates that H_0 is rejected. This means there is a significant difference in critical thinking skills between experimental and control class students after learning.

Effect Size (Cohen's d)

$$d = \frac{83 - 60}{SD_{pooled}} = 4.9$$

Category: Large

The effect size value indicates that the use of the Heyzine Flipbook-based e-book provides a practically meaningful impact on improving students' critical thinking skills.

Summary Comparison of Experimental and Control Classes

Table 7. Comparison of pretest, posttest, and N-Gain

Class	Pretest (Mean)	Posttest (Mean)	N-Gain	Category
Experimental (VII A)	50	83	0.66	Medium
Control (VII B)	45	60	0.27	Low

Based on the comparison table, the improvement in critical thinking skills in the experimental class was higher than in the control class. This difference is indicated by higher posttest and N-Gain mean values in the experimental class. Independent t-test results showed significance value $p < 0.05$, indicating statistically significant differences in learning outcomes between the two classes. In addition, the effect size results were categorized as large, indicating that the Heyzine Flipbook-based e-book has a practically meaningful impact on improving students' critical thinking skills.

Discussion

The results of the study indicate a difference in the improvement of critical thinking skills between the experimental class and the control class. At the initial stage, the critical thinking abilities of both classes were relatively similar, with the average pretest score of the experimental class categorized as moderate and the control class categorized as low. However, after the treatment was implemented, the improvement in the experimental class was substantially higher than that in the control class. The significant improvement in the experimental class is reflected in the average posttest score, which reached 83 with an N-Gain value in the moderate category. In addition, several students achieved posttest scores ≥ 90, indicating that the Heyzine Flipbook-based e-book media was not only effective for students with moderate ability levels but also capable of optimizing the potential of high-ability students. This finding suggests that interactive digital learning media can facilitate higher-order thinking processes through more contextual, visual, and engaging material presentation that encourages active student participation.

These findings are consistent with previous research by Cahyono et al. (2024), which reported that interactive digital teaching materials can enhance students' cognitive activity and learning engagement, thereby positively impacting critical thinking skills. Digital-based media allow the integration of text, images, and reflective activities that support deeper processes of analysis, evaluation, and conclusion drawing. In contrast, the improvement in the control class was categorized as low, with an N-Gain value in the low category. Learning using conventional media in the form of textbooks tends to be information-delivery oriented, limiting students' opportunities to explore, analyze, and reflect on learning materials critically. This condition is consistent with findings reported by Noor et al. (2025), which showed that conventional learning results in lower improvements in critical thinking skills compared to learning using innovative approaches. Statistical test results showed a significance value of $p < 0.05$, indicating a statistically significant difference between the two classes. Furthermore, the effect size value was categorized as large, demonstrating that the use of the Heyzine Flipbook-based e-book media provided a strong practical impact on improving students' critical thinking skills. Therefore, the effectiveness of the media is not only evident from the difference in average scores but is also supported by substantial influence strength.

Overall, the results of this study reinforce the importance of integrating interactive digital learning media in Pancasila Education learning as an effort to support the development of 21st-century skills, particularly critical thinking skills. The use of Heyzine Flipbook-based e-books can serve as a strategic alternative to continuously improve the quality of learning.

Conclusion

Based on the research results and discussion, it can be concluded that the use of a Heyzine Flipbook-based e-book is effective in improving students' critical thinking skills in Pancasila Education learning. The improvement in the experimental class was higher than that in the control class, as indicated by the average posttest score and the N-Gain value in the moderate category. The statistical test results showed a significant difference between the experimental class and the control class ($p < 0.05$), with the effect size categorized as large. This indicates that the use of the Heyzine Flipbook-based e-book is not only statistically significant but also has a strong practical impact on improving students' critical thinking skills. In contrast, learning using conventional media in the form of textbooks resulted in relatively low improvement. Therefore, the integration of interactive digital learning media can serve as a strategic alternative to improve learning quality and support the development of critical thinking skills as part of 21st-century skills.

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