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Implementation of Prompt-Based Learning Using Flow AI Video Generator to Support Elementary School Students' Critical Thinking Skills

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Abstract: The use of artificial intelligence in education offers opportunities to create more creative and student-centered learning. In elementary schools, many students face difficulties when required to construct persuasive sentences logically and critically. This study aims to describe how prompt-based learning, assisted by the Flow AI video generator platform, is applied to support the development of students' critical thinking skills in learning persuasive sentences. This research employs a descriptive qualitative approach with a best practice study design and involves 27 fourth-grade elementary school students aged 10–12 years. Data were collected through classroom observations, student work results, and reflective notes, then analyzed thematically. The findings show that prompt-based learning assisted by Flow AI technology increases students' motivation, participation, and engagement in learning. Students demonstrated improved abilities in analyzing persuasive messages, organizing ideas logically, understanding communication objectives, and critically considering the target audience. The novelty of this study lies in its integration of Prompt-Based Learning, an AI video creation platform (Flow AI), and Indonesian language content within the TPACK framework at the elementary school level a combination that has not been previously explored. This study concludes that integrating AI-based technology with appropriate learning approaches can effectively support critical thinking development and student-centered learning at the elementary education level.

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Introduction

The rapid development of digital technology is increasingly influencing the field of education, including at the elementary school level. One significant innovation is the use of artificial intelligence (AI) in the teaching and learning process. Previous research has shown that digital technology can enhance students' interest and learning outcomes, particularly when multimedia elements such as images, sound, and video are effectively integrated. According to Mayer (2021), combining visual and verbal information in learning media helps

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students understand material more deeply. Similarly, digital video-based learning media have been found to improve students' conceptual understanding and learning motivation (Wang et al., 2022). A recent report by UNESCO (2023) indicates that the adoption of generative AI tools in primary education has accelerated globally, with approximately 34% of primary school teachers in Asia reporting experimental use of AI-based content creation tools in their classrooms, underscoring the urgency of understanding how such technologies can be meaningfully implemented at the elementary level.

In an AI supported learning environment, generative AI technologies such as AI video generators offer new opportunities for students to create learning content quickly and creatively. Research by Holmes & Tuomi (2022) and Darwin et al. (2024) indicates that the use of AI in education can develop higher-order thinking skills, such as critical thinking and problem-solving. Furthermore, the implementation of AI in project-based learning has also been shown to increase student participation and engagement (Yilmaz et al., 2023). Despite this growing body of evidence, the integration of generative AI tools specifically AI video generators into Indonesian language learning at the elementary level remains largely unexplored, representing a critical gap that this study seeks to address.

The use of technology in education is not sufficient with digital tools alone. It also requires appropriate teaching methods and a strong understanding of subject matter. One of the best frameworks to explain how technology can be used effectively is TPACK (Technological Pedagogical Content Knowledge), which emphasizes the importance of combining technological knowledge, teaching methods, and subject content to make the learning process more meaningful (Schmid et al., 2020). In digital learning, teachers should not merely use technology as a conventional aid; technology must become part of a teaching strategy that encourages students to think actively and critically. Recent research shows that TPACK-based learning environments can enhance student engagement, creativity, and critical thinking skills because technology is used in a meaningful way (Rahman, 2023; Sihanita et al., 2024). The development of generative AI is now increasingly expanding the application of the TPACK framework in schools. AI-based tools such as video generators, chatbots, and prompt-based applications provide students with opportunities to learn reflectively, analytically, and creatively (Mishra et al., 2024).

In this study, the implementation of Prompt-Based Learning with the assistance of the Flow AI video generator reflects the TPACK framework because technology (Flow AI), pedagogical approach (Prompt-Based Learning), and content (Indonesian language persuasive sentences) are integrated simultaneously. Specifically, the Technological Knowledge (TK) component is represented by teachers' and students' ability to operate the Flow AI platform; the Pedagogical Knowledge (PK) component is reflected in the structured prompt-construction, presentation, and reflection activities; and the Content Knowledge (CK) component is grounded in the persuasive sentence material in Indonesian language learning. The intersection of these three components is what drives meaningful and critical learning in this study. Critical thinking skills can also be developed through active learning approaches

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such as Problem-Based Learning (PBL), Inquiry-Based Learning, and Project-Based Learning (PjBL), which involve students directly in analyzing, evaluating, arguing, and making decisions (Darmawati & Mustadi, 2023; Haryanti et al., 2022; Rizmayannudin & Zulikhatin Nuroh, 2025). In this study, the AI video generator serves only as a learning support tool, while the development of critical thinking abilities emerges from student activities during the process of creating, evaluating, and refining prompts.

Prompt-Based Learning is an emerging approach in the field of education where students learn by creating specific commands or questions to trigger artificial intelligence systems to generate certain responses. Through this method, students are encouraged to think systematically, logically, and to reflect on what they have done. Research by Saragih et al. (2026) shows that creating prompts helps students organize their ideas and achieve more meaningful learning. In addition, students also learn to evaluate and improve the responses generated by AI, thereby enhancing higher-order thinking skills, such as the ability to control and monitor the learning process (Li et al., 2024). Prompt-Based Learning is thus not merely a technological activity, but a cognitive exercise that requires students to plan, evaluate, and revise their thinking.

A preliminary observation conducted before the intervention revealed that in Indonesian language classes at the elementary school level, particularly in learning persuasive sentences, most students focused more on visual aspects and imitated slogans without truly understanding the communication purpose or identifying the target audience. Fewer than 30% of students were able to clearly articulate the persuasive intent of their messages during conventional poster-making activities. Students often only understood persuasive messages superficially and struggled to connect advertisements or persuasive messages with real-life situations (Riana et al., 2025). The learning media commonly used in classrooms were also too limited, resulting in fewer opportunities for students to learn in authentic and relevant ways. These observations confirm the urgency of developing a more active and technology-supported learning approach.

Although numerous studies have examined multimedia learning, the use of artificial intelligence, and project-based learning separately, there is limited research that integrates all three simultaneously in the context of elementary-level Indonesian language education. For example, studies on multimedia learning by Mayer (2021) and Wang et al. (2022) have not been applied specifically to prompt-based tasks; research on AI in education by Holmes & Tuomi (2022) has focused primarily on higher education contexts; and studies on project-based learning by Darmawati & Mustadi (2023) and Rizmayannudin & Zulikhatin Nuroh (2025) have not incorporated AI video creation tools. Most existing studies employ artificial intelligence merely as a supportive tool, rather than as an integral component of students' thinking processes. Furthermore, very few studies specifically investigate the application of prompt-based learning combined with AI-powered video creation tools in Indonesian language education. The specific contribution of this study lies in demonstrating how the integration of Prompt-Based Learning and Flow AI within the TPACK framework can

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activate students' critical thinking in a subject area Indonesian language that has received limited attention in AI-integrated learning research.

Given the existing gap, this study proposes a learning approach that combines Prompt-Based Learning with the Flow AI video creation application in Indonesian language learning. This approach is expected to help students understand and create persuasive sentences in a more creative, contextually appropriate, and meaningful way. This research aims to describe the implementation of prompt-based learning assisted by the Flow AI video generator in Indonesian language learning, particularly on persuasive sentence material, and to examine the extent to which this approach can support the development of critical thinking skills of elementary school students.

Research Method

This research employs a descriptive qualitative approach with a best practice study design. Its purpose is to systematically describe how Prompt-Based Learning is implemented alongside an AI video generator in classroom learning activities. Rather than testing a specific theory, this study focuses on exploring the learning process, student reactions, and the potential development of critical thinking skills through technology-supported learning activities. This research emphasizes natural classroom practices, particularly in Indonesian language learning on the topic of persuasive sentences.

This research involved 27 fourth-grade elementary school students aged 10–12 years who were learning persuasive sentence material in the Indonesian language subject at an elementary school in Bekasi City, West Java, Indonesia. The classroom was equipped with 15 Chromebook devices and stable internet access, which supported the use of the Flow AI application. Participant selection was conducted purposively based on two considerations: the availability of technology facilities in the classroom and the suitability of student characteristics with the research objectives. The students had diverse academic abilities and digital literacy skills, reflecting a generally heterogeneous classroom composition. The teacher-researcher had taught Indonesian language for six years and had received prior training regarding digital learning tools.

To minimize potential observer bias arising from the dual role of teacher-researcher, several strategies were employed. First, data triangulation was applied by comparing findings from three independent sources: classroom observation sheets, student work artifacts, and reflective field notes. Second, a critical friend a fellow teacher not involved in the study reviewed the observation notes and offered alternative interpretations to counterbalance the researcher's perspective. Third, member checking was conducted by sharing selected observation summaries with students and asking them to confirm the accuracy of the recorded behaviors. These strategies are consistent with Lincoln & Guba's (1985) trustworthiness criteria for qualitative research.

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The main instruments used in this research include structured observation sheets, student learning outcomes, and reflective field notes. The observation sheets were used to record how actively students engaged, collaborated, and demonstrated critical thinking during the learning process, guided by eight observable indicators. Student learning outcomes consisted of written prompt drafts, AI-generated videos, and presentation results. Reflective field notes documented classroom conditions, student responses, and difficulties arising during the learning process.

The indicators of critical thinking observed in this research were operationalized through a structured observation rubric. Each indicator was rated on a three-level scale: (1) Not Yet Evident the behavior was absent or minimal; (2) Developing the behavior appeared inconsistently; and (3) Evident the behavior was consistently demonstrated. Two independent raters (the teacher-researcher and the critical friend) applied the rubric to a sample of student work artifacts to ensure inter-rater consistency. The eight indicators and their observable descriptions are presented in Table 1.

Table 1. Indicators of Critical Thinking and Observation Rubric

No.	Critical Thinking Indicator	Description of Students' Activities	Observation Level
1	Analyzing Persuasive Messages	Students identify the main ideas, communication purposes, and persuasive elements contained in the message.	1: No identification; 2: Partial identification; 3: Complete identification with rationale.
2	Organizing Ideas Logically	Students arrange ideas systematically and develop coherent persuasive sentences before creating prompts.	1: Random; 2: Some structure; 3: Clear logical sequence.
3	Identifying Target Audience	Students determine the intended audience and adjust language and message accordingly.	1: No audience consideration; 2: General audience mentioned; 3: Specific audience with justification
4	Evaluating AI-Generated Outputs	Students assess whether the AI-generated video matches the original prompt, communication goals, and persuasive intent.	1: No evaluation; 2: Surface evaluation; 3: Critical evaluation with revision plan
5	Revising and Improving Prompts	Students modify and improve prompts based on feedback and evaluation results.	1: No revision; 2: Minor revision; 3: Substantive revision with reasoning
6	Making Decisions Critically	Students select appropriate words, visuals, and persuasive strategies to	1: Random choices; 2: Some deliberate choices;

No.	Critical Thinking Indicator	Description of Students' Activities	Observation Level
		strengthen message effectiveness.	3: Choices explicitly justified
7	Reflecting on Learning Process	Students reflect on the strengths and weaknesses of their prompts and learning experiences.	1: No reflection; 2: Surface reflection; 3: Deep reflective insight
8	Presenting and Defending Ideas	Students present their AI-generated videos and explain the reasoning behind their persuasive message design.	1: Reads notes; 2: Explains with prompting; 3: Confident explanation with rationale

This research was conducted in three main stages: planning, implementation, and reflection, spread over four weeks. In the planning stage (Week 1), the researcher developed learning objectives, achievement indicators, persuasive sentence materials, and prompt-based learning scenarios. Technological tools were also prepared, including Chromebooks, a digital interactive whiteboard, internet access, and the Flow AI video creation application. Data collection instruments (observation sheets, reflective note templates) were finalized and reviewed by a peer educator.

During the implementation stage (Weeks 2–3), students first participated in a conventional learning activity on persuasive sentences by manually creating posters. This served as a baseline observation of critical thinking behaviors. Students were then introduced to the concept of prompts and guided in using the Flow AI application. They worked individually or in small groups to create prompts containing persuasive messages, communication objectives, and target audiences. These prompts were then transformed into short videos using Flow AI, presented in class, and discussed for effectiveness. In the reflection stage (Week 4), students and the teacher jointly evaluated message clarity, persuasive sentence effectiveness, and alignment between prompts and generated videos. Students revised their prompts based on feedback, and the teacher documented key insights through reflective notes.

Data analysis was conducted qualitatively through three stages following Miles & Huberman's (1994) framework. The first stage was data reduction: raw data from observations, student artifacts, and field notes were coded using open coding, then grouped into categories (e.g., "prompt elaboration," "audience consideration," "revision behavior"). The second stage was data display: coded data were organized into descriptive narratives and tables to illustrate patterns across participants and sessions. The third stage was conclusion drawing and verification: recurring patterns across data sources were identified as themes, and conclusions were triangulated against the original research questions and the theoretical framework. Member checking with two students and a peer reviewer was conducted to verify the credibility of interpretations.

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Table 2. Research Procedure and Data Collection Framework For Implementing Prompt- Based Learning with Flow

Stage	Procedures	Data Collection
1.Planning (Week 1)	• Determine learning objectives and indicators • Prepare persuasive sentence materials • Design Prompt-Based Learning scenario •Prepare Flow AI video generator and technological tools • Prepare observation sheets and documentation instruments	• Teacher reflective notes (planning) • Learning materials and instruments
2. Implementation (Weeks 2–3)	1. Conventional Learning Activity Students create manual persuasive posters. Initial observation of students' critical thinking. 2. Introduction to Prompt-Based Learning Explanation of prompts and AI systems. Demonstration of Flow AI video generator. 3. Prompt Construction Activity Students create prompts individually/in groups by considering persuasive message, communication goals, and target audience. 4. AI Video Generation Prompts are transformed into videos using Flow AI. 5. Presentation and Discussion Students present their videos. Peer discussion and evaluation of persuasive messages.	• Observation of learning process (participation, engagement, collaboration, critical thinking behaviors) • Students' products: – Written prompts – AI-generated videos – Presentation results • Documentation (photos, screenshots)
3. Reflection (Week 4)	• Evaluate message clarity, persuasive sentence effectiveness, and alignment between prompt and AI-generated video • Students revise prompts and learning products • Teacher reflective notes and documentation	• Teacher reflective notes (reflection) • Revised prompts • Final AI-generated videos
4. Data Analysis (Week 4)	Data Reduction Selecting, categorizing, and organizing data relevant to research objectives. Data Display Presenting data in descriptive form (narrative, tables, charts, images). Conclusion Drawing and Verification Identifying patterns and themes to draw conclusions and verify findings.	• All collected data (observations, artifacts, reflective notes)
Findings	Implementation of Prompt-Based Learning with AI video generator and its contribution to students' critical thinking skills.	

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This study specifically examines the application of Prompt-Based Learning using the Flow AI video generator in Indonesian language learning at the elementary school level. The results are applicable to one class with a relatively small number of participants and cannot be generalized broadly. The study focuses on in depth observation of the learning process rather than numerical measurement of outcomes. Future studies could employ mixed methods or experimental approaches to more comprehensively evaluate the effectiveness of this learning model.

Result and Discussion

Result

The use of prompt-based learning with the assistance of the Flow AI video creation platform showed positive developments in student engagement and critical thinking during persuasive sentence learning. Initially, when learning activities employed conventional methods, most students focused only on visual appearance and imitated slogans without truly understanding the communication purpose, identifying the message recipient, or evaluating the effectiveness of the message. Based on the baseline observation, fewer than 30% of students demonstrated intentional audience consideration, and most prompts before revision were generic, such as "Make a video about health" without specifying the audience, message goal, or persuasive strategy. The following examples illustrate the progression of student thinking.

One student's initial prompt read: "Buat video tentang makan sayur" (Make a video about eating vegetables). After the introduction of Prompt-Based Learning and reflection on the evaluation criteria, the revised prompt became: "Buat video pendek yang mengajak anak-anak usia 8–10 tahun untuk makan sayur setiap hari dengan alasan kesehatan yang menyenangkan dan gambar yang menarik" (Create a short video that invites children aged 8–10 to eat vegetables every day, using fun health reasons and attractive visuals). This revision demonstrates a clear progression in the student's ability to specify target audience, communication purpose, and persuasive strategy three key components of critical thinking as measured by the observation rubric.

After implementing prompt-based learning, students became more active in crafting persuasive messages through prompt-writing activities. They were able to organize ideas more systematically, understand communication objectives, select appropriate persuasive language, and consider the characteristics of the target audience before creating videos with AI assistance. The process of revising prompts and evaluating the AI-generated video outputs also encouraged students to think more critically and reflectively. One student noted in a reflection session: "Saya harus menulis ulang promptnya karena videonya tidak menunjukkan siapa yang diajak bicara" (I had to rewrite the prompt because the video didn't show who the message was for), demonstrating awareness of the relationship between prompt specificity and output quality.

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Classroom observations revealed improvements in student participation, collaboration, and learning motivation. Students showed enthusiasm when transforming prompts into videos using Flow AI and became more confident when presenting and discussing their work. The AI-generated videos reflected students' creativity and their ability to convey persuasive ideas in a more meaningful and contextually appropriate manner. Learning interactions became more student-centered, with increased peer discussion about message effectiveness and audience targeting.

Tabel 3. Students' Critical Thinking Development During Prompt-Based Learning Activities

No.	Critical Thinking Indicators	Initial Condition (Conventional Learning)	Findings After Prompt-Based Learning Implementation
1	Analyzing Persuasive Messages	Students tended to copy slogans without analyzing message meaning deeply.	Students were able to identify persuasive purposes, main messages, and audience needs more critically.
2	Organizing Ideas Logically	Ideas were fragmented and not systematically organized.	Students organized prompts more systematically and logically before generating videos.
3	Identifying Communication Purposes	Students had difficulty determining the purpose of persuasive communication.	Students clearly identified communication goals and adjusted persuasive language appropriately.
4	Considering Target Audience	Limited attention was given to audience characteristics.	Students considered audience age, interests, and context when designing prompts.
5	Evaluating AI-Generated Outputs	Students rarely reflected on the effectiveness of their work.	Students evaluated whether AI-generated videos matched their prompts and persuasive intentions.
6	Revising and Improving Prompts	Students seldom revised their learning products.	Students actively revised prompts after peer discussion and reflection activities.
7	Participation and Engagement	Classroom participation was relatively passive during conventional learning.	Students became more active, collaborative, and enthusiastic during AI-assisted activities.
8	Creativity in Presenting Ideas	Students relied mainly on static visual posters.	Students expressed persuasive ideas creatively through AI-generated videos and presentations.

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Table 3 illustrates the observable development of students' critical thinking across eight indicators, comparing their behavior during conventional learning and after the implementation of Prompt-Based Learning. The most notable improvements were evident in students' ability to identify target audience and evaluate AI-generated outputs two indicators that were minimally present during the conventional learning baseline. Overall, the shift from passive imitation of slogans to active, reflective prompt construction reflects a meaningful development in students' analytical and critical thinking processes throughout the learning activities.

Table 4. Observation Results of Students' Learning Activities

Learning Activities	Observation Findings
Prompt Construction	Students discussed persuasive strategies actively and collaborated in organizing ideas.
AI Video Generation	Students showed high motivation and curiosity when transforming prompts into videos using Flow AI.
Presentation Session	Most students confidently presented their videos and explained persuasive intentions clearly.
Reflection Activities	Students identified weaknesses in their prompts and revised them critically after feedback.
Classroom Interaction	Learning interactions became more student-centered and discussion-oriented.

Table 4 summarizes the key observation findings across five main learning activity stages. The data indicates that students demonstrated increasing levels of engagement, collaboration, and critical reflection as the learning progressed from prompt construction to presentation and reflection activities. Notably, classroom interactions shifted from teacher-centered to student-centered, with peer discussion playing a significant role in supporting students' critical evaluation of persuasive messages and AI generated video outputs.

Research findings also indicated that the use of AI-generated video media created a more interactive and student-centered learning environment. Students were no longer passive recipients of information but actively engaged in analyzing, evaluating, and refining their work throughout the learning process.

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Discussion

The findings suggest that Prompt-Based Learning integrated with the Flow AI video generator can support the development of elementary school students' critical thinking skills in persuasive sentence learning. The improvement in students' abilities to analyze messages, organize ideas logically, and evaluate AI-generated outputs aligns with previous studies highlighting the importance of active learning approaches in fostering higher-order thinking

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skills (Darmawati & Mustadi, 2023). The implementation of prompt construction activities encouraged students to engage in systematic and reflective thinking before generating outputs through AI systems. This finding supports research by Singh et al. (2025), who state that prompt-based interactions with AI can stimulate analytical and metacognitive thinking because students are required to formulate instructions carefully and evaluate the relevance of generated responses.

Several factors appeared to contribute to the success of this implementation. First, the iterative nature of prompt revision writing, generating, evaluating, and revising created a structured cycle of reflective thinking consistent with Schön's (1983) concept of reflection-in-action. This was evidenced by the fact that two groups (6 students) revised their prompts after the video generation stage, citing mismatches between their intended message and the AI-generated output, such as inaccurate sentence phrasing and characters that did not align with their original prompt description. Notably, the remaining two groups did not require revision, as their outputs already met the persuasive sentence criteria indicating that prompt quality directly determined output quality, reinforcing the cognitive value of careful prompt construction from the outset.

Second, the novelty and visual engagement of the AI-generated video output served as intrinsic motivation for students to critically evaluate their own work. Upon viewing their videos for the first time, students responded with enthusiasm exclaiming expressions of excitement but quickly shifted to critical awareness, identifying specific weaknesses in the generated content. Some students expressed disappointment when the output did not meet their expectations and independently initiated prompt revision without being prompted by the teacher. This spontaneous self-correction reflects a form of intrinsic motivation driven by the desire to produce higher-quality output, which is consistent with research linking authentic task feedback to increased student agency (Singh et al., 2025).

Third, the collaborative peer discussion during the presentation and reflection stages provided meaningful social scaffolding. During the reflection session, each group presented their AI-generated video and invited other groups to evaluate its strengths and weaknesses against the persuasive sentence criteria. This peer evaluation activity generated active discussion and mutual prompt correction among students, creating a student-centered learning dynamic in which critical feedback was exchanged organically. This finding aligns with Vygotsky's (1978) concept of the Zone of Proximal Development, in which peer interaction supports cognitive growth beyond what students could achieve independently.

This research provides benefits both theoretically and practically. Theoretically, this study expands the application of the Prompt-Based Learning method and the TPACK framework in the context of AI-assisted primary education. Practically, the research demonstrates how AI-based video creation technology can be integrated into persuasive sentence learning to develop critical thinking through active and reflective processes. It also presents an example of a best-practice learning model that can be adapted by teachers who wish to use AI tools in their language learning activities. Schools and curriculum designers

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may also consider incorporating prompt-literacy skills as a component of digital literacy education at the elementary level.

Conclusion

This study demonstrates that the implementation of prompt-based learning with the assistance of the Flow AI video generator has the potential to support the development of elementary school students' critical thinking skills when learning about persuasive sentences. The findings indicate that the integration of AI technology with active learning strategies appeared to foster a more interactive, meaningful, and student-centered learning environment. Students showed indications of development in analyzing persuasive messages, organizing ideas logically, recognizing communication purposes, evaluating AI-generated outputs, and revising prompts during the learning process. The iterative cycle of prompt writing, AI video generation, peer evaluation, and reflection appeared to be a key mechanism through which critical thinking was exercised and supported.

This study also suggests that AI-assisted learning, when embedded within the TPACK framework and accompanied by structured pedagogical activities, has the potential to serve not merely as a technological support tool but as a catalyst for students' reflective and analytical thinking. Nevertheless, given the qualitative and small-scale nature of this study, the findings should be interpreted as indicative patterns rather than definitive evidence of causal impact. Future research is recommended to explore the implementation of prompt-based learning across various subjects and educational levels using experimental or mixed-method designs, to more comprehensively evaluate its long-term impact on students' critical thinking, creativity, and digital literacy.

Recommendation

The recommendation section should describe suggestions for future research and possible improvements related to the implementation of Prompt-Based Learning assisted by AI video generator technology. Future studies are recommended to involve larger and more diverse participants, apply experimental or mixed-method designs, and explore the use of other AI-based media to measure long-term impacts on students' critical thinking and language skills. In addition, further research may investigate the effectiveness of this approach in different subjects and educational levels.

Several barriers and limitations were also identified in this study. Differences in students' digital literacy skills influenced their ability to construct effective prompts and operate AI tools independently. Limited internet access and technological devices occasionally disrupted the learning process. Furthermore, the qualitative and small-scale nature of the study may limit the generalizability of the findings. These factors should be considered in future implementations and research development.

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