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Integrating Video Scribe and Problem-Based Learning: A Development Study to Foster Elementary Students' Conceptual Understanding in Natural and Social Sciences

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Abstract: This study aims to develop and implement VideoScribe-based learning media integrated with the Problem-Based Learning (PBL) model to improve students' conceptual understanding in Natural and Social Sciences (IPAS) at the elementary school level. Employing a Research and Development (R&D) approach based on the ADDIE model, the study involved 20 fourth-grade students selected through purposive sampling at SDN Tanjungan 1. The students participated in a small-scale pilot evaluation as part of the implementation phase of the ADDIE model to assess the feasibility and practicality of the VideoScribe-based learning media prior to broader implementation. Data were collected through observations, interviews, pretests and posttests, questionnaires, and documentation, and were analyzed using qualitative and quantitative techniques, including descriptive statistics and the N-Gain formula. The results showed that the developed media achieved an overall feasibility score of 86.3%, indicating a high level of validity across the material, media, and language aspects. Furthermore, students' conceptual understanding improved, as reflected in the increase in the mean score from 48.20 on the pretest to 84.10 on the posttest, with the N-Gain falling within the moderate-to-high category. These findings suggest that integrating VideoScribe-based learning media with the PBL model has the potential to enhance students' learning outcomes. The study contributes to the growing body of literature by providing empirical evidence that aligning multimedia tools with student-centered pedagogical models can support the development of students' conceptual understanding. It also offers practical implications for teachers seeking to design more interactive, contextualized, and meaningful learning environments, particularly in elementary education contexts.

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Introduction

Education is a systematic and continuous process that aims to improve the quality of human resources. It not only focuses on transferring knowledge but also develops students' thinking skills, attitudes, and values. Through education, individuals develop in cognitive, affective, and psychomotor aspects and gradually improve their competencies (Institut et al., 2020). Education also aims to develop individuals as a whole by supporting their intellectual, moral, and social development (Biesta, 2015). The development of globalization and technology has increased the demands on education. Students are expected to develop important 21st-century skills, including critical thinking, creativity, communication, and collaboration. Technology-based and innovative learning can support the development of these skills (Dini et al., 2024). In addition, student-centered learning that involves active

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participation can improve learning interactions and strengthen 21st-century competencies (Triyanto et al., 2022). The effectiveness of learning is also influenced by teacher–student interaction, instructional strategies, and student engagement (Schindler et al., 2017). High-quality teaching combined with student-centered learning can further improve learning outcomes (Darling-Hammond et al., 2020).

At the elementary school level, education provides an important foundation for developing students' basic competencies. At this stage, students develop their thinking skills, social abilities, and readiness for further learning (Marhayani, 2018). One subject that supports this development is Social Studies, which is integrated into Natural and Social Sciences (IPAS) in the current curriculum. IPAS helps students understand social phenomena related to economic, cultural, historical, and human interaction in everyday life (Mauizatul Hasanah, 2022). It also supports the development of social awareness and critical thinking in responding to social issues (Banks, 2015). Furthermore, Social Studies learning can improve students' social sensitivity and analytical abilities toward their environment (Marini et al., 2023).

However, the implementation of Social Studies learning in elementary schools still faces several challenges. Numerous studies indicate that instruction is still largely dominated by teacher-centered approaches, resulting in limited student participation (Ardianti et al., 2021). This condition reduces opportunities for students to develop higher-order thinking skills. In addition, monotonous and less interactive learning environments can hinder students' conceptual understanding, particularly when learning materials involve concepts that are difficult to observe directly (Setyaningrum et al., 2020). Recent research also reveals that the suboptimal integration of technology in learning is a contributing factor to the low effectiveness of efforts to develop 21st-century skills (Muda et al., 2025). Other findings further reinforce that limited variation in instructional media can reduce students' learning interest and engagement (Astuti et al., 2026).

One topic in IPAS that requires particular attention is economic activities, which is taught to fourth-grade elementary school students. This topic introduces students to fundamental economic concepts, including production, distribution, and consumption, as well as the relationships among these activities in fulfilling human needs. Although economic activities are closely related to students' daily lives, the underlying concepts may still be difficult for fourth-grade students to understand because they involve processes, relationships, and sequences that cannot always be directly observed or represented through verbal explanations alone. Students are not only required to identify different forms of economic activities but also to understand how production, distribution, and consumption are interconnected within everyday economic processes. Consequently, learning that relies predominantly on verbal explanations, textbooks, or static images may make it difficult for students to visualize these processes and construct a comprehensive conceptual understanding.

The abstract and process-oriented nature of economic activities therefore requires learning media that can present concepts in a more concrete, visual, and dynamic manner. Dynamic multimedia can help transform abstract concepts into visual representations that are more accessible to elementary school students. In this context, VideoScribe offers potential as a learning medium because it combines animated illustrations, text, narration, and sequential visual presentations to explain concepts through an engaging and structured format. The visualization of economic activities through animation can help students observe the sequence and relationships among production, distribution, and consumption, while contextual examples can connect the concepts with situations that students encounter in their

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daily lives. Thus, the use of VideoScribe is expected to facilitate students' understanding of economic activities by making abstract and process-oriented concepts more concrete, visual, and meaningful.

Furthermore, the use of VideoScribe can be strengthened through the integration of the Problem-Based Learning (PBL**)** model. PBL provides students with opportunities to engage with contextual problems, investigate relevant information, discuss possible solutions, and construct knowledge through active learning experiences. When applied to the topic of economic activities, this approach can encourage students to analyze problems related to production, distribution, and consumption in their surrounding environment. The combination of dynamic visualization through VideoScribe and problem-based learning is therefore expected to increase students' engagement while facilitating deeper conceptual understanding of economic activities. This approach is particularly relevant for elementary school students, who benefit from learning experiences that connect abstract concepts with concrete visual representations and real-life situations.

On the other hand, various instructional innovations have been developed to address these issues. One widely applied approach is Problem-Based Learning (PBL), which emphasizes contextual problem-solving activities. This model has been shown to enhance student engagement and promote critical thinking through exploration and discussion (Yusuf & Maulana, 2022). Other studies indicate that PBL improves conceptual understanding by actively involving students in information seeking and processing (Qondias et al., 2022). Furthermore, PBL is considered effective in developing analytical and problem-solving skills relevant to real-life situations (Dolmans et al., 2016). Additional findings confirm that problem-based approaches can enhance higher-order thinking skills as well as students' independent learning abilities (García-Merino et al., 2020).

In addition to instructional models, the use of learning media plays a significant role in improving the quality of instruction. Multimedia-based learning media, which integrate visual and auditory elements, have been proven effective in facilitating more concrete and meaningful understanding of concepts (Mayer, 2009). Other studies suggest that the use of digital technology in learning can significantly enhance student engagement and motivation (Schindler et al., 2017). Furthermore, the integration of innovative instructional models with multimedia has been reported to improve learning outcomes and critical thinking skills, particularly at the elementary level (Azhari et al., 2025). Additional research also shows that interactive multimedia in problem-based learning strengthens conceptual understanding and increases active participation (Pratama & Setyasto, 2024).

Despite the effectiveness of Problem-Based Learning and multimedia being widely reported in separate studies, research that integrates both approaches particularly through the use of VideoScribe-based animation media in IPAS learning at the elementary level, remains limited. Most existing studies tend to focus on a single approach, leaving the potential synergy between instructional models and media underexplored. This condition indicates a research gap that warrants further investigation. Based on these issues, there is a need for an instructional innovation that effectively integrates learning models and media. Problem-Based Learning provides opportunities for students to actively construct knowledge through contextual and collaborative problem-solving processes (Dolmans et al., 2016). Meanwhile, the use of VideoScribe as an animation-based medium allows for visually engaging, structured, and systematic content delivery, which facilitates students' understanding of complex concepts.

The motivation for this study is grounded in empirical observations at SDN Tanjungan 1 Province Banten, where Social Studies instruction is still dominated by lecture-

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based methods with limited use of instructional media. This condition has resulted in low student interest and inadequate conceptual understanding. Furthermore, the implementation of the Merdeka Curriculum, which emphasizes student-centered learning, provides a strong foundation for developing more interactive and meaningful instructional innovations. In line with this, the present study aims to develop and implement VideoScribe-based learning media integrated with the Problem-Based Learning model to improve students' conceptual understanding in IPAS at the elementary school level. This study is expected to contribute both theoretically, by enriching the discourse on innovative learning approaches, and practically, by providing alternative solutions for teachers in creating more effective, engaging, and relevant learning environments. Ultimately, this research is expected to support the improvement of educational quality and the optimal development of 21st-century skills among students.

Research Method

This study used a Research and Development (R&D) method with the ADDIE model. The ADDIE model has five stages: analysis, design, development, implementation, and evaluation. This model was chosen because it is simple, systematic, and flexible for developing learning media. It also allows continuous improvement in each stage. In addition, ADDIE has been widely used in developing technology-based learning media and is proven to produce valid, practical, and effective products (Aldoobie, 2020).

The research procedure followed the ADDIE stages. In the analysis stage, the researcher identified learning needs through curriculum review, student characteristics, and learning difficulties in the topic of economic activities. In the design stage, the researcher created a storyboard, a VideoScribe video script, and research instruments. The learning video was designed based on the Problem-Based Learning (PBL) steps. In the development stage, the video was produced by combining animation, narration, and real-life problems. The product was then validated by media, subject-matter, and language experts, and revised based on their feedback. In the implementation stage, the media was used in classroom learning using the PBL model. Students took part in the learning process and completed pretest and posttest activities. In the evaluation stage, formative evaluation was done during development to improve the product, while summative evaluation was used to see the effectiveness of the media in improving students' understanding.

This study was conducted at SDN Tanjungan 1 with 20 fourth-grade students. The participants were selected using purposive sampling based on specific criteria related to the topic of economic activities. The students had different academic abilities (high, medium, and low), actively participated in IPAS learning, and had never used VideoScribe-based learning media before. These criteria were used to ensure that the participants represented different learning levels and were suitable for a small-scale trial. The students' involvement provided data on the feasibility, practicality, and effectiveness of the developed learning media in real classroom conditions.

Data were collected using observation, interviews, tests, questionnaires, and documentation. Observation was used to see the initial learning situation, student characteristics, and student engagement. Interviews with the teacher were conducted to identify learning difficulties and the need for new learning media. Pretest and posttest were used to measure students' understanding before and after using the media. Questionnaires were given to experts and students to assess the quality and practicality of the product. Documentation such as photos and learning records was also collected. Using several data

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collection methods helped improve the validity of the data through triangulation (Creswell & Creswell, 2020).

The research instruments included observation sheets, interview guidelines, expert validation sheets, student questionnaires, and multiple-choice tests. All instruments were developed based on learning indicators and competencies. The validity of the instruments was checked by experts, while reliability testing was used to ensure consistent results. Instrument validation is important in development research to ensure that the data collected is accurate and trustworthy (Retnawati, 2021).

Data analysis was carried out using qualitative and quantitative methods. Qualitative data from observations, interviews, and documentation were analyzed through data reduction, data display, and conclusion drawing to describe the learning process and student responses. Quantitative data were analyzed using descriptive statistics and percentage calculations to determine the feasibility and practicality of the media. The effectiveness of the media was measured using the Normalized Gain (N-Gain) formula to see the improvement in students' learning outcomes from pretest to posttest. N-Gain is suitable for measuring learning improvement in educational research (Sundayana, 2020).

Results and Discussion

To facilitate a clearer understanding of the research findings, the results are systematically presented in four main sections. First, the prerequisite test for data analysis aims to ensure that the collected data meet statistical assumptions and are suitable for further analysis. Second, the product feasibility test describes the validity and quality of the media based on expert evaluations. Third, the description of the final product outlines its characteristics, components, and advantages. Fourth, the effectiveness test explains the extent to which the developed media improves students' conceptual understanding. This structured presentation is intended to provide a comprehensive overview of the development and implementation process.

Prerequisite Test for Data Analysis

Before conducting the effectiveness analysis, a normality test was performed as a prerequisite for parametric statistical analysis. The test was conducted to determine whether the pretest and posttest scores were normally distributed. The Shapiro–Wilk test was used because the study involved a relatively small sample of 20 students. The analysis was performed using SPSS, with a significance level of 0.05. The results of the normality test are presented in Table 1.

Table 1. Results of the Shapiro–Wilk Normality Test

Data	df	p-value (Sig.)	Interpretation
Pretest	20	0.121	Normally distributed
Posttest	20	0.200	Normally distributed

As shown in Table 4.15, the pretest data obtained a significance value of 0.121, while the posttest data obtained a significance value of 0.200. Both values are greater than the significance level of 0.05 (0.121 > 0.05 and 0.200 > 0.05). Therefore, the pretest and posttest scores can be considered normally distributed. These results indicate that the data meet the normality assumption required for subsequent parametric analysis. Accordingly, a paired-samples t-test was employed to examine whether there was a statistically significant difference between students' pretest and posttest scores following the implementation of the VideoScribe-based learning media integrated with the Problem-Based Learning model.

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Product Feasibility Test Results

The feasibility test was conducted to assess the developed learning media. Three experts evaluated the media: subject-matter, media, and language experts. They assessed the content, language, visual design, and use of the PBL model.

Table 2. Learning Media Feasibility Test Results

No.	Expert Type	Feasibility Score	Category
1	Material Expert	86%	Feasible
2	Media Expert	88%	Feasible
3	Language Expert	85%	Feasible
	Overall Feasibility	**86.3%**	**Feasible**

The results showed that the media were feasible to use. The scores were 86% for material, 88% for media, and 85% for language, with an overall score of 86.3%. The experts also suggested improving the color contrast, simplifying some terms, and adjusting the animation speed. These suggestions were used to improve the final product. The results are consistent with previous studies showing that animated videos are feasible as learning media because they combine visual and instructional elements effectively.

Description of the Final Product

The final product developed in this study is an animated instructional video created using the VideoScribe application, developed systematically based on the ADDIE model (Analysis, Design, Development, Implementation, Evaluation).The media is designed for teaching economic activities in fourth-grade elementary school, covering the concepts of production, distribution, and consumption. The material is presented in a structured and sequential manner to facilitate students' understanding of conceptual relationships.

In general, the characteristics of the developed media include: (1) structured and systematic presentation of content, (2) the use of dynamic whiteboard animations, (3) clear and communicative audio narration, and (4) integration of Problem-Based Learning stages.

The integration of PBL enables students to actively engage in the learning process through stages such as problem orientation, student organization, investigation, presentation, and reflection. During implementation, observations showed that students demonstrated higher engagement compared to conventional learning. They actively participated in discussions, expressed ideas, and engaged in problem-solving activities. This indicates that the developed media supports student-centered learning and creates a more interactive and meaningful learning environment.

Effectiveness Test Results

The effectiveness of the VideoScribe-based instructional media integrated with the Problem-Based Learning model was measured by comparing pretest and posttest scores using the N-Gain formula. The results showed that the average pretest score was 48.20, indicating relatively low initial understanding. After the implementation of the media, the average posttest score increased to 84.10. This improvement indicates a significant enhancement in students' conceptual understanding. The N-Gain results fall within the moderate to high category, suggesting that the media effectively contributes to improving learning outcomes.

Table 3. Pretest and Posttest Results

Assessment	Mean Score	Interpretation
Pretest	48.20	Low initial understanding
Posttest	84.10	High understanding
Mean Improvement	35.90	Improved learning outcome

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This improvement is influenced by several factors, including contextual problem presentation, active student engagement, visualization through animation, and the integration of audio-visual elements. These findings are supported by previous studies showing that multimedia learning enhances conceptual understanding by engaging multiple cognitive processes simultaneously. Additionally, integrating PBL with video-based media has been shown to improve critical thinking and problem-solving skills. In conclusion, the integration of VideoScribe-based instructional media with the Problem-Based Learning model is proven to be an effective strategy for improving students' conceptual understanding, particularly in learning economic activities at the elementary school level.

Discussion

The findings of this study show that the VideoScribe-based instructional media integrated with the Problem-Based Learning (PBL) model is feasible and has the potential to improve fourth-grade students' conceptual understanding of economic activities. The developed media obtained an overall feasibility score of 86.3%, consisting of 86% for material feasibility, 88% for media feasibility, and 85% for language feasibility. In addition, the students' average score increased from 48.20 in the pretest to 84.10 in the posttest. The N-Gain results were in the moderate to high category. These results indicate that the developed media can support students in understanding the concepts of production, distribution, and consumption.

The effectiveness of VideoScribe and PBL can be explained from the perspective of children's cognitive development and Cognitive Load Theory. Fourth-grade students are still developing their ability to understand abstract concepts. Therefore, they need learning materials that are presented through concrete examples, visual representations, and familiar situations. Economic activities involve concepts such as production, distribution, and consumption, as well as the relationships among them. Although these activities are part of students' daily lives, the relationships among the concepts may be difficult to understand if they are explained only through verbal descriptions or textbooks.

VideoScribe helps present these concepts through animation, text, and narration. The material can be presented step by step, allowing students to focus on important information and understand the relationships among the concepts. From the perspective of Cognitive Load Theory, information should be presented in a way that does not overload students' working memory. VideoScribe can help organize information in a simple and sequential form, making abstract economic concepts easier to understand. This explanation is supported by Abdulrahaman et al. (2020), who found that multimedia combining visual and auditory elements can support more effective information processing. Therefore, the benefit of VideoScribe is not only its attractive appearance but also its ability to make abstract concepts more concrete and easier for elementary school students to understand.

The PBL model complements the use of VideoScribe by involving students actively in the learning process. Students are encouraged to identify problems, find information, discuss possible solutions, present their ideas, and reflect on what they have learned. These activities encourage students to connect new information with their previous knowledge and apply economic concepts to real-life problems. Hasanah and Cholily (2023) found that PBL integrated with animation media can improve students' critical thinking skills. Similarly, Salim et al. (2024) reported that the integration of PBL and multimedia can improve students' problem-solving abilities.

The combination of VideoScribe and PBL is therefore important because the two components have complementary functions. VideoScribe helps students see and understand information through clear and sequential visual representations, while PBL encourages them

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to use the information to solve problems and construct their own understanding. In other words, VideoScribe helps students understand the material, while PBL encourages them to actively use what they have learned. This combination is suitable for elementary school students because it provides both visual support and opportunities for active learning.

The improvement in students' conceptual understanding is consistent with previous studies on multimedia learning. Tuhuteru et al. (2023) found that interactive multimedia-based learning media can improve students' learning outcomes and conceptual understanding. Similarly, Safitri et al. (2026) reported that interactive multimedia has a positive effect on students' learning outcomes. The findings of the present study support these previous studies by showing that VideoScribe-based media can also help improve students' understanding, particularly in learning economic activities.

The findings also support Anggraeni et al. (2025), who found that animation-based media can improve conceptual understanding by using visual and auditory channels. However, the present study extends this previous research by combining animation-based media with the PBL model. Thus, VideoScribe is not only used to present learning content but is also integrated into activities that require students to analyze problems and find solutions.

The findings are also consistent with Pasaribu and Suartama (2025), who found that the integration of PBL with contextual video media can improve students' motivation and learning outcomes. The present study supports their findings and extends them to the topic of economic activities and the use of VideoScribe for fourth-grade elementary school students. Similarly, Putri and Apriza (2024) found that animated videos can increase student engagement and achievement in elementary education. The observations in this study also showed that students actively participated in discussions, expressed their ideas, and engaged in problem-solving activities. Furthermore, Sekarwangi and Sartono (2021) found that PBL-based interactive multimedia has a positive effect on elementary students' conceptual understanding. Therefore, the findings of this study support and extend previous research rather than contradicting it.

The use of contextual problems also helps students understand economic activities more easily. Concepts such as production, distribution, and consumption are closely related to students' everyday experiences. When these concepts are presented through familiar problems, students can connect the learning material with situations in their own environment. This is consistent with the purpose of Social Studies learning, which helps students understand social phenomena and their relationship to everyday life (Mauizatul Hasanah, 2022). It also supports Banks (2015), who emphasized the importance of Social Studies in developing students' understanding of social issues and their ability to participate in society. In addition, Marini et al. (2023) found that Social Studies learning can improve students' social sensitivity and analytical abilities toward their environment.

The feasibility results also support the quality of the developed media. The overall feasibility score of 86.3% indicates that the media met the established feasibility criteria. The media was considered appropriate in terms of content, visual design, language, and its integration with the PBL model. The validators suggested several improvements, including increasing color contrast, simplifying some terms, and adjusting the animation speed. These suggestions were used to improve the final product. This finding is consistent with Chandra et al. (2024), who stated that the quality of digital learning media is influenced by visual design, content structure, and its suitability for users.

Compared with conventional teacher-centered learning, the use of VideoScribe integrated with PBL provides students with more opportunities to participate actively in the

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learning process. This finding is consistent with Untari et al. (2020), who found that multimedia-based learning can be more effective than traditional learning methods in improving students' learning outcomes. Similarly, Ainullah and Jampel (2023) reported that PBL supported by multimedia has a positive effect on students' learning outcomes. The present study supports these findings and extends them by applying VideoScribe integrated with PBL specifically to the topic of economic activities for fourth-grade elementary school students.

Overall, the findings of this study support previous research on the use of multimedia, animation, and PBL in learning. The findings do not contradict the previous studies cited in this research. Instead, they strengthen and extend previous findings by showing that VideoScribe and PBL can work together to support students' conceptual understanding. VideoScribe provides clear and sequential visual representations, while PBL encourages students to actively use the information to solve contextual problems. This combination makes learning more concrete, active, and meaningful for elementary school students.

From a theoretical perspective, the findings support the principles of Cognitive Load Theory by showing the importance of presenting information in a clear, organized, and manageable form. From a practical perspective, the findings show that technology-based media can be effectively combined with a student-centered learning model. Therefore, the integration of VideoScribe and PBL can be considered a promising approach for supporting students' understanding of economic activities at the elementary school level. This finding is also consistent with Safitri et al. (2026), who emphasized the positive contribution of interactive multimedia to students' learning outcomes.

Conclusion

In conclusion, the VideoScribe-based learning media integrated with the Problem-Based Learning (PBL) model is feasible in terms of pedagogical, technical, and language aspects and can improve students' understanding of economic activities, as shown by the increase in posttest scores and N-Gain results. This improvement is supported by the combination of simple animated visualization, contextual problem-solving activities, and active student participation, which helps students understand abstract concepts more easily and reduces their cognitive load. These findings support multimedia learning and constructivist learning theories, showing that the use of technology and appropriate learning models can improve students' understanding and learning skills. Practically, this study offers an alternative learning strategy for teachers to create more interactive and student-centered learning, especially in the implementation of the Merdeka Curriculum at the elementary school level.

Recommendation

Based on the findings, it is recommended that teachers use VideoScribe-based learning media integrated with the Problem-Based Learning (PBL) model to make learning more visual, contextual, and active, especially for abstract concepts. For learning media developers, it is suggested to improve the design by making animations more interactive, adjusting the speed and language to students' levels, and aligning the content with curriculum needs. For future researchers, it is recommended to conduct studies with larger samples, longer implementation periods, and different subjects or education levels, as well as to compare this approach with other learning models or media to further test its effectiveness.

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