



Development of Canva-Based Interactive Multimedia Using the Addie Model to Enhance Engagement and Critical Thinking Skills in Science Learning

Irma Mulyani^{1,*} , Elly Sukmanasa¹ , Riandi Marisa¹

¹ Department of Master Primary Education, Graduate School, Indonesia Open University, Banten, Indonesia

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ABSTRACT

Purpose of the study: IPAS learning in primary schools still shows low student engagement and weak critical thinking, partly because the media used are not sufficiently interactive. This study develops Canva-based interactive multimedia that is valid, practical, and effective for improving engagement and critical thinking among IV students.

Methodology: The research adopts a Research and Development (R&D) approach using the ADDIE model, which consists of five phases: Analysis, Design, Development, Implementation, and Evaluation.

Main Findings: The findings indicate that the Canva-based interactive multimedia meets validity criteria and shows good reliability (Cronbach's Alpha = 0.864), and is categorized as highly practical in the One-to-One Trial (91%), Small Group Trial (94%), and Field Trial (97.5%).

Novelty/Originality of this study: The use of the media significantly increased student engagement (emotionally, cognitively, and behaviourally) and improved critical thinking in IPAS learning. Canva-based interactive multimedia is thus effective and appropriate for primary classrooms. Its novelty lies in systematically integrating interactive activities to strengthen engagement and critical thinking, offering a technology-based innovation that supports more active, student-centred learning.

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Corresponding Author:

Irma Mulyani,

Master of Primary Education, Graduate School, University Terbuka, Jl. Cabe Raya, Pamulang, South Tangerang, Banten, 15437, Indonesia

Email: irmanuy1515@gmail.com

1. INTRODUCTION

The accelerating development of information and communication technology has profoundly changed teaching and learning practices, reshaping how teachers present content and how students receive and process information. These advances in ICT have transformed learning processes in schools [1], [2]. Recent studies further emphasize that teachers' digital competence is a crucial factor for meaningful ICT integration in the classroom [3]. In the digital era, teachers are expected to use technology in their instruction so that learning becomes more engaging, interactive, and closely connected to students' everyday experiences [4]. One important innovation in this context is the use of interactive multimedia in classroom activities, which can enrich how content is presented and experienced by students. The ongoing development of information and communication technology also requires teachers to integrate digital media into their teaching [5], [6], so that learning becomes

more interactive and engaging, while remaining aligned with the Merdeka Curriculum's focus on strengthening students' competencies and critical thinking skills [7], [8]. Interactive multimedia provides students with opportunities for active learning by bringing together multiple elements such as text, images, animations, video, and audio [9], [10].

In the context of IPAS learning in Grade IV, preliminary observations indicate that classroom instruction is still dominated by teacher-centred lecturing, with limited use of visual media and interactive multimedia. This situation leads to low levels of student engagement and less-than-optimal critical thinking, even though the Merdeka Curriculum calls for learning that is active, contextual, and learner-centred. Student engagement itself is a crucial component in determining the success of the teaching-learning process. They explain that student engagement encompasses behavioural, cognitive, and affective dimensions, which influence learners' motivation, attention, and participation during lessons [11]. The authors also argue that teachers' digital literacy is a key factor for effective 21st-century teaching and for fostering higher-order thinking skills [12]. Student engagement is emphasised as concrete, observable participation in the learning process, for example taking part in discussions and collaborating in group work [13]. They view student engagement as a holistic learning experience that encompasses cognitive, emotional, and social dimensions. In line with this perspective, the Merdeka Curriculum promotes learner-centred instruction that prioritises the strengthening of competencies, character, and 21st-century skills, including critical thinking [14]-[16]. Critical thinking involves the ability to analyse, evaluate, and make decisions grounded in evidence and logical reasoning [17].

The lack of critical thinking skills among students can be attributed to several factors, including: (1) limited understanding of the problems they encounter; (2) a tendency to quickly forget material that has been taught; (3) difficulty in linking abstract concepts to real-world situations; (4) low concentration and a tendency to become easily bored during lessons; and (5) learning activities that are not contextualised to students' everyday experiences [18]. They emphasise that critical thinking skills are essential for navigating contemporary learning, particularly in supporting decision-making that draws on evidence and considers multiple perspectives [19], [20]. Students who possess strong critical thinking skills tend to solve problems independently, express their opinions with well-founded arguments, and reflect thoughtfully on their own learning processes [21]. In general, critical thinking is understood as the ability to analyse, evaluate, and draw conclusions from information in a logical and rational manner [22], [23]. Consequently, instructional strategies that effectively foster the development of these skills are highly needed.

A number of studies indicate that Canva, as a web-based graphic design platform, has considerable potential to be developed into engaging interactive learning media that is easily accessible for both teachers and students [24]. Canva is a web-based graphic design application that provides a wide range of templates and interactive features within a user-friendly interface. Drawing on the work of [26], the use of Canva in classroom instruction can enhance the appeal of learning materials while simultaneously creating space for the creativity of both students and teachers [27]. Learning media are regarded as a vital component of the instructional system; when any one component is absent, learning outcomes tend to be less than optimal. Media encompass various communication tools and channels, including films, television broadcasts, graphics, printed materials, computer devices, and the role of the instructor [28].

One promising alternative to address these challenges is the use of contextual Canva-based interactive multimedia, which integrates visual, narrative, and local elements into the learning materials [34]. Canva helps students grasp abstract content through an engaging combination of animations, audio, video, images, graphics, and text, thereby enhancing their attention and learning focus [35]. In addition, its animation features enable teachers to present content in more innovative and interactive ways, which has a positive impact on students' learning outcomes [36]. The use of Canva has been shown to increase the attractiveness of learning materials and foster creativity [37], [38], while also promoting engagement and critical thinking skills among primary school students when integrated into IPAS instruction using the ADDIE development model. Nevertheless, the implementation of truly contextual Canva-based interactive multimedia that is explicitly oriented towards strengthening engagement and critical thinking in Grade IV IPAS lessons remains limited.

This study employs a Research and Development (R&D) approach using the ADDIE model [39]. The ADDIE model is a systematically designed framework for developing instruction through five main phases: Analysis, Design, Development, Implementation, and Evaluation, providing a structured basis for creating instructional systems and materials [40]. In this research, it is applied to develop Canva-based interactive multimedia for Grade IV IPAS learning. The research problems and objectives are formulated as follows: the study seeks to examine how Canva-based interactive multimedia for IPAS is developed by applying the ADDIE model for Grade IV students at SDN Tarikolot 01, and how this multimedia can enhance students' learning engagement and critical thinking skills. More specifically, the study aims to: (1) develop Canva-based interactive multimedia that is suitable for use in Grade IV IPAS lessons; (2) test the feasibility of the media based on expert judgments and field trials; and (3) analyse its effectiveness in improving elementary students' engagement and critical thinking skills.

2. RESEARCH METHOD

This study is a Research and Development (R&D) project that adopts the ADDIE model (Analyse, Design, Development, Implementation, Evaluation) [41], focusing on the creation of Canva-based interactive multimedia for Grade IV IPAS learning in primary schools [39]. The ADDIE model is selected because it offers procedures that are systematic, well-structured, and easy to follow [42], while supporting the development of learning that is innovative, authentic, inspiring, and responsive to students' needs [43].

The participants in this study are Grade IV elementary school students in Gugus V Cibinong during the even semester of the 2025–2026 academic year, with an initial population of 120 students distributed across four classes. The research sample is selected using purposive sampling, which is a sampling technique based on specific criteria aligned with the aims of the study [44]. This technique is applied to select participants whose characteristics are relevant to the focus of the study [45]. Accordingly, two classes are selected as the sample: one experimental class and one control class, each consisting of 30 students [46]. In media development research, selecting samples at a specific grade level and assigning them to experimental and control groups is crucial to ensure that the impact of the innovative Canva-based interactive multimedia intervention can be compared systematically. In this thesis, the experimental class is the setting where Canva-based interactive multimedia is implemented in IPAS lessons, while the control class follows conventional instruction, allowing students' engagement and critical thinking skills to be measured and contrasted in line with the research objectives.

The instruments used in this study include validation sheets for teaching materials and media, Likert-scale questionnaires on student engagement and responses, written tests to assess critical thinking skills, observation sheets, as well as interview and documentation guidelines. Data are collected through expert validation, classroom observations, questionnaires, pretests and posttests, interviews with teachers and students, and documentation over four weeks of IPAS lessons using Canva-based interactive multimedia. Quantitative data analysis employs descriptive statistics to portray students' engagement and critical thinking skills, alongside t-tests to examine the effectiveness of Canva-based interactive multimedia in improving engagement and critical thinking.

The research instruments used in this study were adapted from a range of previous works that are relevant to the constructs being measured. The student engagement instrument was developed with reference to the concept of student engagement proposed by Fredricks, Filsecker, and Lawson, who conceptualise engagement as a multidimensional construct encompassing behavioural, cognitive, and emotional components; accordingly, the questionnaire items were designed to reflect these three dimensions within the context of IPAS learning. The critical thinking instrument was constructed by referring to indicators of critical thinking formulated by Facione, Rakhmawati and Nurhayati, and other studies on critical thinking, so that interpretation, analysis, evaluation, inference, and explanation were systematically represented in the test blueprint and scoring rubric. The instrument measuring responses and perceptions of the Canva-based interactive learning media was adapted from the work of Wulandari and Mudinillah, Syahid et al., and other studies examining the feasibility, effectiveness, and practicality of digital media in primary schools, thereby covering indicators such as visual appeal, ease of use, interactivity, and alignment with instructional objectives. The reliability test results show that the critical thinking skills test instrument obtained a Cronbach's Alpha value of 0.864, which falls into the high reliability (good) category. This indicates that the instrument has strong internal consistency and is suitable for use as a data collection tool.

Four key reasons underpin the choice of the ADDIE development model in the thesis Development of Contextual Animated Videos to Enhance Student Engagement and Critical Thinking Skills [47]-[51]. Systematic and integrated structure, The ADDIE model offers clear and sequential stages (analysis, design, development, implementation, and evaluation), which facilitate the planned and measurable development of instructional media such as animated videos; Flexibility and adaptability, ADDIE allows adjustments at each stage according to instructional needs and student characteristics, including the integration of relevant contexts to enhance student engagement; Orientation toward learning objectives, Each phase in the ADDIE model is directed at achieving instructional goals, which aligns with the main target of media development, namely improving students' engagement and critical thinking skills; Support for continuous evaluation, The model emphasizes the importance of both formative and summative evaluation to ensure the effectiveness of the developed animated videos and to enable ongoing refinement based on feedback from students and teachers.

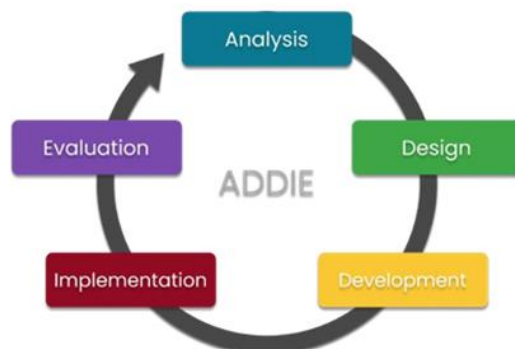


Figure 1. Desain Addie

Table 1. Stages of the ADDIE Model, Activities, Outputs, and Research Variables

ADDIE Stage	Conducted Activities	Outputs	Involvement of Research Variables
Analysis	Learning needs analysis – Identification of problems and objectives – Analysis of student characteristics and the curriculum	Formulation of learning objectives – Data on students' needs – Specification of the problem	Identifying the needs to enhance student engagement and critical thinking through interactive media x
Design	Designing learning strategies – Developing media scenarios and storyboards – Designing initial and final assessments	Initial design of the Canva-based media – Plan for measuring engagement and critical thinking	Canva media design that targets students' emotional and cognitive engagement – Adjustment of content to foster critical thinking
Development	Developing Canva-based interactive media – Expert validation of media and content – Revisions based on validation results	Final Canva-based media product – Validation and revision instruments	Implementation of interactive elements that stimulate students' active participation – Integration of activities that encourage analysis, evaluation, and reflection
Implementation	Using the media in real classroom settings – Observing the learning process – Collecting student learning outcomes data	Student engagement data – Critical thinking test results – Implementation report	Direct application of the variables: Canva-based media → enhancing engagement and critical thinking through actual classroom use
Evaluation	Evaluation of media effectiveness – Analysis of pre- and post-test data – Feedback from teachers and students	Evaluation report on media effectiveness – Recommendations for further development	Measurement of the impact of Canva-based media on enhancing student engagement and critical thinking skills

Data collection techniques in this study were quantitative in nature, using several instruments applied directly in the field. First, validation sheets completed by material experts and media experts were used to assess the feasibility and quality of the Canva-based interactive multimedia. Second, student response questionnaires and student engagement questionnaires with a Likert scale were administered after the use of the media to capture learners' perceptions, motivation, and level of engagement during the learning process. Third, written essay-type tests were administered as pre-tests and post-tests to measure students' critical thinking skills on the topic of force. In addition, the researcher conducted direct classroom observations using structured observation sheets to record student engagement while using the interactive multimedia, and carried out structured and semi-structured interviews with the teacher and several students to explore their learning experiences and their evaluation of the media's effectiveness.

The field procedure was implemented over four weeks in two elementary schools. In the first week, the researcher conducted socialization activities with the school and parents, administered the critical thinking pre-test, and gathered baseline data on student engagement prior to the use of the media. In the second and third weeks, the Canva-based interactive multimedia was implemented in four IPAS learning sessions, while the researcher and teacher observed student engagement and documented the learning process. In the fourth week,

the researcher administered the post-test, distributed the engagement and response questionnaires, and conducted brief interviews with the teacher and several students; the data from tests, questionnaires, and observations were then analyzed using descriptive statistics and t-tests to evaluate the effectiveness of the media on the engagement and critical thinking skills of IV students.

3. RESULTS AND DISCUSSION

The results of this study show that the development and implementation of Canva-based interactive multimedia in Grade IV IPAS lessons effectively address all of the research questions posed. First, in terms of the development process, the R&D approach using the ADDIE model successfully produced an interactive multimedia product that was judged to be highly feasible by material experts, media experts, and feasibility experts, with an average feasibility score of around 92% and classified as “highly appropriate.” This process encompassed needs analysis, the design of content and interactivity, product development, expert validation, revisions, and a series of trials (one-to-one, small-group, and field trials), all of which confirmed that the media were aligned with the curriculum, student characteristics, and the goals of enhancing engagement and critical thinking.

Second, in relation to student engagement, the practicality tests and user responses indicate that Canva-based interactive multimedia is highly practical and can enhance students’ participation in IPAS lessons. Across the one-to-one, small-group, and field-trial stages, the percentage of teacher and student responses regarding the practicality of the media fell into the “highly practical” category, with average scores above 90%. Classroom observations showed that, when using this media, students were more active in paying attention, answering and asking questions, taking part in interactive activities, and engaging in discussions and group work than in conventional lessons. These findings suggest that Canva-based interactive multimedia makes a tangible contribution to increasing students’ cognitive, affective, and behavioural engagement.

Third, in terms of critical thinking skills, analysis of pretest–posttest data for the control and experimental groups using t-tests, normality and homogeneity checks, and N-Gain calculations shows a significant improvement in the group taught with Canva-based interactive multimedia. The average critical thinking scores of students in the experimental group increased more than those in the control group, with an N-Gain of about 0.63 (moderately effective category), compared with approximately 0.43 (less effective category) for the control group. The paired t-test yielded a significance value of 0.000 (<0.05) for the experimental group’s pretest–posttest scores, and the independent t-test indicated a significant difference between the experimental and control groups, confirming that the use of Canva-based interactive multimedia is effective in enhancing students’ critical thinking skills.

Results of the Product Tryout

One-to-One Trial for Teacher’s Response in the One-to-One Trial Tes can see on table 3.

Table 2. Teacher’s Response in the One-to-One Trial Tes

Respondent	Percentage Score	Category
Teacher IV	90%	Very Practical

At the one-to-one trial stage (table 2), the fourth-grade teacher’s response to the practicality of the media reached 90%, which falls into the very practical category and indicates that the media is suitable for use and for proceeding to subsequent testing stages.

Table 3. Student Response in the One-to-One Trial

Respondent	Media	Learning Material	Language
Students 1	39	19	12
Students 2	55	20	14
Students 3	46	19	12
Total Score	140	58	38
Mean Score	47	19	13
Percentage per Aspect	85%	95%	87%
Score Percentage		92%	
Category		Very Practical	

The student responses in the one-to-one trial showed an overall percentage of 92%, which falls into the very practical category. Based on each aspect, the media obtained 85% for the media component, 95% for the learning material, and 87% for language. These results indicate that the Canva-based interactive multimedia is easy to use, easy to understand, and highly practical for supporting IPAS learning.

Table 4. Recapitulation of the Practicality of the Canva-Based Interactive Multimedia in the One-to-One Trial

Practicality Data	Score Percentage	Category
Teacher Responses	90%	Very Practical
Student Responses	92%	Very Practical
Average Teacher and Student Responses	91%	Very Practical

The practicality test results indicate that the Canva-based interactive multimedia was rated as very practical. The teacher's response reached 90% and the students' response 92%, with an overall average of 91%. These findings suggest that the media is suitable for use as supporting instructional material for IPAS in fourth-grade elementary classes.

Small Group Trial Test (results of the teacher and student response scale)

Table 5. Teacher Response Results in the Small Group Trial Test

Respondent	Score Percentage	Category
Teacher IV	93%	Very Practical

The responses of the fourth-grade teacher in the small group trial showed a score percentage of 93%, which falls into the "very practical" category. This means that the interactive multimedia being tested is considered very easy to use, aligned with learning needs, and appropriate to be utilized in the IPAS learning process for fourth-grade students.

Table 6. Student Response Results in the Small Group Trial

Practicality Data	Score Percentage	Level of Practicality
Teacher Responses	93%	Very Practical
Student Responses	95%	Very Practical
Average Teacher and Student Responses	94%	Very Practical

The practicality of the media was assessed using questionnaires during the small group trial stage. The teacher's response reached 93 percent and the students' response 95 percent, both of which fall into the very practical category. The average practicality score of 94 percent indicates that the media is easy to use and supports the learning process for both teachers and students, making it suitable for further implementation.

Table 7. Teacher Response Results in the Field Trial

Respondent	Score Percentage	Category
Teacher IV	96%	Very Practical

The teacher's responses in the field trial showed a score of 96 percent, which is categorized as very practical. This result indicates that the media is considered very easy to use and effectively supports learning in fourth-grade classes.

Table 8. Student Response Results in the Field Trial

Description	Result
Number of Respondents	30 Students
Percentage Score for Media Aspect	97%
Percentage Score for Learning Material Aspect	100%
Percentage Score for Language Aspect	100%
Overall Percentage Score	99%
Category	Very Practical

The responses of the 30 students in the field trial showed a practicality percentage of 97% for the media aspect, 100% for the learning material aspect, and 100% for the language aspect, with an overall percentage of 99% in the very practical category. These findings indicate that the media is considered very easy to use, the content greatly supports understanding, and the language used is very clear for the students.

Table 9. Practicality Data in the Field Trial

Practicality Data	Score Percentage	Level of Practicality
Teacher Responses	96%	Very Practical
Student Responses	99%	Very Practical
Average Teacher and Student Responses	97,5%	Very Practical

During the field trial, the media demonstrated a very high level of practicality. The teacher's response reached 96% and the students' response 99%, with an average score of 97.5%, all of which fall into the very practical category. These findings indicate that the media is considered very easy to use and effectively supports the learning process from both the teacher's and students' perspectives.

Table 10. Student Engagement Observation Results

No	Aspect of Engagement	Number of Indicators	Score Obtained	Maximum Score
1	Cognitive	4	10	20
2	Affective/Emotional	3	8	15
3	Behavioral	3	9	15
	Total	10	27	50

Based on the results of the student engagement observation, the total score obtained was 27 out of a maximum score of 50. The cognitive aspect scored 10 out of 20, the affective/emotional aspect 8 out of 15, and the behavioral aspect 9 out of 15. These findings indicate that students' cognitive, affective, and behavioral engagement falls into the moderate category, so further efforts are needed to strengthen student activities and participation in the learning process.

Table 11. Pretest and Posttest Data on Critical Thinking Skills

Statistics	Control Group		Experimental Group	
	Pre-Test	Post-Test	Pre-Test	Post-Test
Number of Students	30	30	30	30
Mean	19.67	32.77	20.20	29.03
Median	20	34.00	21	30
Mode	21	36	21	30
Standard Deviation	3.614	3.884	3.755	5.129

The descriptive statistics of critical thinking skills show that, in the control group, the mean score increased from 19.67 (pretest) to 32.77 (posttest), with the median rising from 20 to 34 and the mode from 21 to 36. In the experimental group, the mean score increased from 20.20 to 29.03, with the median increasing from 21 to 30 and the mode from 21 to 30. The standard deviation in the control group changed from 3.614 to 3.884, while in the experimental group it increased from 3.755 to 5.129, indicating score improvements in both groups with greater variability of results in the experimental group.

Table 12. Normality Test Results of Critical Thinking Skills Data

Data	Group	Sig.	Description
Pre-Test	Control	0.278	Normal
	Experiment	0.300	Normal
Post-Test	Control	0.107	Normal
	Experiment	0.115	Normal

In the pretest, the significance value for the control group was 0.278 and for the experimental group 0.300, both greater than 0.05, indicating that the pretest data were normally distributed. In the posttest, the significance value for the control group was 0.107 and for the experimental group 0.115, which are also greater than 0.05, so the posttest data for both groups met the normality assumption. The normality test thus showed that all critical thinking skills data were normally distributed. The significance values of the pretest and posttest for both the control and experimental groups were each greater than 0.05, indicating that the data satisfied the normality assumption and were suitable for analysis using parametric statistics.

Table 13. Normality Test Results for Critical Thinking Skills Data

Data	Group	Sig.	Description
Pre-Test	Control - Experiment	0,940	Normal
Post-Test	Control - Experiment	0,361	Normal

The homogeneity of variance test showed that the critical thinking skills data in the control and experimental groups were homogeneous in the pretest (sig. = 0.940) and posttest (sig. = 0.361), thus meeting the assumptions for parametric analysis.

Table 14. Paired t-Test Results

Variable	Data	Group	Sig.	Description
Critical Thinking	Pre-Test Post-Test	Experiment	0.000	There is a statistically significant difference

The paired t-test in the experimental group yielded a significance value of 0.000 ($p < 0.05$), indicating a significant difference between the pretest and posttest scores of critical thinking skills.

Table 15. Independent Samples t-Test Results

Variable	Data	Group	Sig.	Description
Critical Thinking	Pre-Test Post-Test	Experiment	0.002	There is a statistically significant difference

The independent samples t-test on critical thinking skills scores produced a significance value of 0.002 ($p < 0.05$), indicating a significant difference between the groups being compared.

Table 16. Statistics of Critical Thinking Skills Scores

Description	Control Group		Experimental Group	
	Pre-Test	Post-Test	Pre-Test	Post-Test
Number of Students	30	30	30	30
Maximum Score	27	40	26	40
Minimum Score	13	20	13	25
Average Score	20.2	29.03	19.7	32.8
Average N-Gain	0.43		0.63	
N-Gain Effectiveness	43% (Low)		63% (Moderate)	

Descriptively, the average critical thinking skills score in the control group increased from 20.2 to 29.03 with an N-gain of 0.43 (43%; low category), while in the experimental group it rose from 19.7 to 32.8 with an N-gain of 0.63 (63%; moderate category). These findings indicate that instruction in the experimental group was more effective in improving critical thinking skills than in the control group.

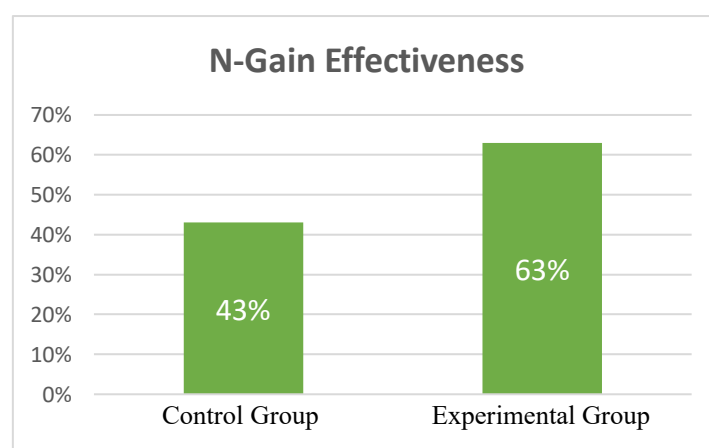


Figure 2. Comparison of N-Gain Effectiveness in Conceptual Understanding

Product Revision

Validation by experts led to several refinements of the Canva-based interactive multimedia before classroom trials. Material experts recommended better alignment between the instructional videos and the target content on force, prompting revisions so that examples and videos more clearly matched the concepts presented. Media experts judged the product suitable for elementary classrooms and advised registering it for intellectual property protection, which the researcher prepared to pursue after the study. The multimedia feasibility expert confirmed that content, presentation, and language met appropriate standards, with revisions focused mainly on technical polishing such as wording, visual consistency, and clarity. Overall validation classified the product as

highly feasible, and the resulting revisions aimed to enhance its quality and classroom effectiveness in fostering engagement and critical thinking in IPAS learning.

Table 17. Product Revision Based on Validation and Trial Results

Validator	Suggestions	Revisions Made
Material Expert	Adjusting the instructional video to match the lesson content.	Revising the content and presentation of the video to align with the topic of force.
		
Media Expert	Refining the media before implementation.	Improving the quality of videos, navigation, and barcode access.
		
Feasibility Expert	Refining the language and layout.	Improving the wording, layout, and readability of the media.
		
Teacher (Trial)	Optimizing the use of media in learning.	Simplifying the user instructions and improving the ease of access to the media.
		

Product Feasibility, The Canva based interactive multimedia is considered highly feasible for use in fourth grade IPAS learning. The feasibility is supported by validation results from the material expert (97%, very feasible), the media expert (82%, feasible), the multimedia feasibility expert (95%, very feasible), and teacher

responses (94%, very feasible). Overall, the average feasibility score reached 92% in the very feasible category, indicating that the content, visual design, language, and operational aspects of the media meet the required standards and are appropriate for enhancing students' engagement and critical thinking skills.

Product Practicality, The Canva based interactive multimedia is also rated as very practical for use in IPAS instruction. Teachers gave a score of 94% (very feasible), showing that the media is easy to operate, compatible with school facilities, has clear navigation, attractive visuals, and interactive features that support active student participation. Classroom observations showed that teachers could use the media smoothly and students were able to follow the learning flow well, while the student engagement instrument was also validated as highly feasible (96%). Thus, this product is practical for teachers and students to use in real classroom settings.

Product Effectiveness, The Canva based interactive multimedia has proven effective in improving fourth grade students' engagement and critical thinking skills in IPAS learning. Observations indicated that students became more active in paying attention, participating in discussions, answering questions, and completing tasks when the media was used. Critical thinking skills improved, as reflected in students' ability to identify problems, analyze information, provide justifications, and draw conclusions. The teacher response score of 94% further confirms that the media facilitates understanding of the material, increases learning interest, and encourages student activeness, making it an effective tool for IPAS instruction.

This study still has several limitations. The use of the media is highly dependent on devices and internet connectivity, so its implementation may be hindered if infrastructure and network conditions are inadequate. The field trial was conducted in only one school with 30 students, so the findings cannot yet be generalized to broader contexts. The limited research duration also prevented the assessment of long term effects on critical thinking skills, and differences in students' ability to operate the media required additional guidance for some learners. Therefore, further studies with a wider range of schools and a longer time frame are needed to optimize the implementation of the Canva based interactive multimedia.

4. CONCLUSION

The Canva-based interactive multimedia for fourth-grade IPAS learning at SDN Tarikolot 01 was successfully developed using the ADDIE model and has been deemed suitable for use, as it passed the stages of analysis, design, development, implementation, and evaluation in a systematic manner, with validation results indicating that its content, appearance, language, and interactive functions align with the characteristics of elementary school students. The use of this multimedia has been shown to enhance student engagement in learning, as reflected in increased activity in asking and answering questions, participating in discussions, and displaying greater enthusiasm and interest in learning compared to before its implementation. In addition, the Canva-based interactive multimedia is effective in improving students' critical thinking skills, as evidenced by better abilities in analyzing problems, providing logical reasons, linking information with concepts, and drawing conclusions based on facts. Based on these findings, it is recommended that teachers utilize and further develop Canva-based interactive multimedia as an engaging, student-centered learning medium, that schools provide support in the form of infrastructure and technology training, and that students actively use the media to learn and practice critical thinking. Future researchers are encouraged to extend the implementation and development of this product to other topics or subjects with a larger sample size and more varied evaluation features. Dissemination through links, QR codes, and teacher forums, as well as the development of additional interactive features and offline access, is important so that the benefits of the Canva-based interactive multimedia can be experienced more widely and sustainably.

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AUTHOR CONTRIBUTIONS

This study was conceived and carried out collaboratively by all authors. The first author took primary responsibility for designing the study, developing the Canva-based interactive multimedia, collecting the data, and drafting the initial version of the manuscript. The second author contributed to instrument validation, quantitative data analysis, and the refinement of the methods and results sections. The third author focused on the theoretical review, critical examination of the conceptual framework, and final editing of the manuscript to ensure compliance with scholarly writing standards. All authors reviewed and approved the final version of this article.

CONFLICTS OF INTEREST

The author(s) declare no conflict of interest.

INFORMED CONSENT STATEMENT

Informed consent was obtained from all participants involved in this study. Prior to participation, each subject received a clear explanation of the study's objectives, procedures, potential risks, and anticipated benefits. All participants voluntarily agreed to take part in the research and provided written consent by signing the informed consent form. All images in this article have been authorized and are the property of the authors.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that no artificial intelligence (AI) tools were used in the generation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

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