



Interactive Multimedia for Pancasila Education: Development and Feasibility Study in Primary Education

Ilham Wahyudi^{1*}; Sekar Purbarini Kawuryan²

^{1,2}Primary Education, Universitas Negeri Yogyakarta, Indonesia

^{1*}Corresponding Email: ilhamwahyudi.2021@student.uny.ac.id

Article History:

Received: Jun 21, 2025

Revised: Oct 06, 2025

Accepted: Nov 04, 2025

Online First: Nov 20, 2025

Keywords:

Development of Media,
Educational Media,
Elementary School,
Interactive Multimedia,
Modern Classroom.

Kata Kunci:

Kelas Modern,
Media Pendidikan,
Multimedia Interaktif,
Pengembangan Media,
Sekolah Dasar.

How to cite:

Wahyudi, I., & Kawuryan, S. P. (2025). Interactive Multimedia for Pancasila Education: Development and Feasibility Study in Primary Education. *Edunesia : Jurnal Ilmiah Pendidikan*, 6(3), 1915-1934.

This is an open-access article under the CC-BY-NC-ND license



Abstract: This study aims to develop interactive multimedia products suitable for educational use. The research method used is Research and Development (R&D) through ten stages, namely: (1) preliminary study; (2) planning; (3) initial product development; (4) initial field trial at SD Negeri Demangan with nine research subjects; (5) product revision; (6) main field trial at SD Negeri Giwangan with eighteen subjects; (7) product revision; (8) operational field trial at SD Negeri Jetisharjo with twenty-six subjects; (9) final revision; and (10) dissemination. The study results indicate that the interactive multimedia developed to enhance understanding of concepts and characters in Pancasila Education learning for grade 4 elementary schools is deemed suitable for use. The validation results from media and material experts place the product in the "very suitable" category. In the initial field trial, teachers gave the response "very suitable," while students gave the assessment "suitable." Furthermore, teachers and students assigned assessments to the "very suitable" category in both the main field trial and the operational field test. These findings indicate that the interactive multimedia effectively supports the Pancasila Education learning process and demonstrates the importance of integrating technology in modern classroom practices in elementary schools.

Abstrak: Penelitian ini bertujuan menghasilkan produk multimedia interaktif yang layak digunakan dalam pembelajaran. Metode penelitian yang digunakan adalah Research and Development (R&D) melalui sepuluh tahapan, yaitu: (1) studi pendahuluan; (2) perencanaan; (3) pengembangan produk awal; (4) uji coba lapangan awal di SD Negeri Demangan dengan sembilan subjek penelitian; (5) revisi produk; (6) uji coba lapangan utama di SD Negeri Giwangan dengan delapan belas subjek; (7) revisi produk; (8) uji lapangan operasional di SD Negeri Jetisharjo dengan dua puluh enam subjek; (9) revisi akhir; dan (10) diseminasi. Hasil penelitian menunjukkan bahwa multimedia interaktif yang dikembangkan untuk meningkatkan pemahaman konsep dan karakter dalam pembelajaran Pendidikan Pancasila kelas IV sekolah dasar dinyatakan layak untuk digunakan. Hasil validasi oleh ahli media dan ahli materi menempatkan produk dalam kategori "sangat layak". Pada uji coba lapangan awal, guru memberikan respons "sangat layak", sedangkan siswa memberikan penilaian "layak". Selanjutnya, pada uji coba lapangan utama dan uji lapangan operasional, guru dan siswa memberikan penilaian dalam kategori "sangat layak". Temuan ini menunjukkan bahwa multimedia interaktif yang dikembangkan efektif untuk mendukung proses pembelajaran Pendidikan Pancasila dan menunjukkan pentingnya mengintegrasikan teknologi dalam praktik kelas modern di sekolah dasar.

A. Introduction

The use of technology in education has increased significantly, particularly after the COVID-19 pandemic compelled teachers and students to adopt technology-based media in their learning process (Sartono et al., 2024). This condition requires teachers and students to integrate technology into the implementation of learning from home (Santaria et al., 2020). Elementary school students, who are part of the alpha generation, have demonstrated a high level of familiarity with technology, given that they were born and raised in the digital era, where technology is an integral part of everyday life (Ahmad et al., 2023; Khyzhniak et al., 2021). Technology in learning activities also contributes to increasing students' enthusiasm for learning (Fu, 2022; Samat et al., 2020; Vagg et al., 2020).

Integrating technology into learning is an important element in the teaching process of the alpha generation, who are currently filling elementary school benches. The technology-based learning media used in the classroom are very diverse, including the use of LCD projectors to display images, sound devices to play audio, and animated videos to explain material (Surjono, 2017). These various media bring significant benefits in supporting the learning process.

Learning media acts as a means for teachers to convey messages or information more effectively to students, with the aim that students can understand the learning content optimally (Mar'atussolichah et al., 2024; Ross, 2022). Thus, utilizing learning media is an important strategy to enhance the quality of interaction and effectiveness in the classroom teaching and learning process.

Furthermore, the use of learning media in the classroom is considered very popular among students. Teachers who adopt learning media tend to create learning materials that are easier to understand, more interesting, and more enjoyable (Ibrahim et al., 2021; Ross, 2022; Yorganci, 2022). Technology-based learning media not only make the learning process more positive but also contribute to significantly improving students' cognitive abilities (Sari, 2021).

In today's digital era, utilizing technology-based learning media in elementary schools is a pressing need that warrants development. Interactive multimedia-based learning media combine various elements, such as video, text, audio, animation, graphics, control buttons, and attractive visual displays in one platform (Surjono, 2017). The combination of these various elements makes interactive multimedia one of the alternative learning media that can be used independently by students.

The main advantage of interactive multimedia is its ability to interact directly with users. Thus, students can tailor the learning course to their needs, enabling independent learning (Praheto et al., 2020). Students' independent use of interactive multimedia has also been shown to positively impact their learning process.

Interactive multimedia in learning has various positive impacts on students, including increasing the variety of learning methods to make learning more interesting (Alenezi et al., 2023; Ediyani et al., 2020; Sailer et al., 2021). Previous studies have developed interactive multimedia on general subjects, but few focus on Pancasila Education,

integrating character values for elementary students. Considering these advantages, using interactive multimedia in classroom learning activities should be a primary concern for teachers.

However, the results of interviews with teachers in several public elementary schools in Yogyakarta showed various obstacles in the use of interactive multimedia in the classroom, including: 1) teachers tend to use conventional media and methods still; 2) limited time to create interactive multimedia; 3) lack of facilities from the school to support the creation of interactive multimedia; and 4) symptoms of boredom in students such as yawning, playing, and lack of enthusiasm for conventional media used (Nordesjö et al., 2022; Singh, 2021). Various external and internal factors contribute to the suboptimal use of interactive multimedia in classroom learning.

Based on the results of observations and interviews conducted in elementary schools in Yogyakarta City, an urgent need was found to develop interactive multimedia suitable for use in learning activities. Therefore, this study uniquely develops and tests interactive multimedia specifically tailored to Pancasila Education under the Independent Curriculum.

Based on this background, this study, titled "Interactive Multimedia for Pancasila Education: Development and Feasibility Study in Primary," was submitted. This study aims to develop interactive multimedia products suitable for use by elementary school students to support an effective learning process.

B. Method

The type of research used in this study is Research and Development (R&D), because the main goal is to produce an interactive multimedia product that is appropriate for the learning needs of fourth-grade elementary school students. The research was conducted in March 2024. Referring to the Development Model proposed by Borg & Gall (2003), the process of product development involves a series of structured and systematic stages.

The development process begins with a preliminary study, during which researchers identify problems, analyze learner needs, and review relevant literature as the basis for designing the product. This is followed by a planning phase that includes formulating objectives, determining the required resources, selecting development strategies, and outlining the initial product framework. After the planning stage, the researchers proceed to develop the initial form of the product, creating a prototype of the interactive multimedia to be evaluated.

Once the prototype is ready, it undergoes limited field testing with a small group of users to gather initial feedback regarding its feasibility, usability, and clarity of content. The results from this stage are then used to conduct revisions, improving the prototype before it is tested on a wider scale. The next phase, wider field testing, involves a larger group of students and aims to examine the product's effectiveness in a broader learning environment. Findings from this stage lead to further refinements to ensure the product meets instructional goals.

Afterward, the product enters operational field testing, where it is implemented in real classroom settings to assess its performance during actual learning activities. Feedback obtained from this stage then guides the final revision process, enhancing the product to reach an optimal level of quality. The final stage is dissemination and implementation, where the fully developed interactive multimedia product is introduced, distributed, and applied in educational contexts so it can be utilized by teachers and students.

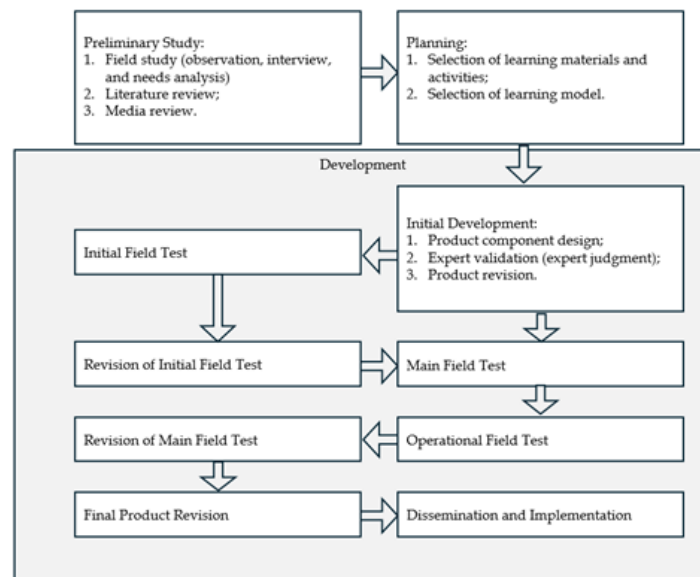


Figure 1. Interactive Multimedia Research and Development Flow

In Stage 1, a preliminary study was conducted to determine the learning needs to be addressed in the field through observation activities, needs analysis, and literature reviews. Stage 2 planning is carried out to determine the objectives of the product being developed. This step involves focus group discussions, national curriculum analysis, identification of student characteristics, analysis of learning objectives and achievements, determination of materials, compilation of teaching modules, and development of assessment grids.

Stage 3 initial development involves compiling the initial interactive multimedia product by creating scripts, flowcharts, and storyboards, collecting required materials, and entering them into the Adobe Flash application.

Stage 4 initial field testing aims to obtain evidence of the feasibility of limited initial products. Interactive multimedia products were tested on nine subjects randomly selected to represent low, medium, and high ability groups. The simulation was conducted with the assistance of class teachers for SDN Demangan students, and data collection was carried out using questionnaires among several students and teachers.

Stage 5 revision of the initial field test: This research stage involves analyzing information collected from the initial test results. Based on responses from students and teachers regarding the obstacles and shortcomings they encountered, the product has been revised to address the issues conveyed, making it ready for testing in the main field.

Stage 6 is the main field test. At this stage, the researcher collects information about the use of the product within a broader research context. Interactive multimedia products will be tested on 18 subjects with varying levels of cognitive ability, categorized into three groups: low, medium, and high. Data collection of student responses and teacher responses obtained at SDN Giwangan.

Stage 7 revision of the main field test: At this stage, an analysis of all information collected in the previous stage is conducted. The revisions aim to make improvements and refinements to interactive multimedia based on input from teachers and students.

Stage 8: Operational field test. At this stage, the researcher determines the feasibility of interactive multimedia products and whether they can be effectively used in subsequent field tests, based on aspects such as material, learning, and appearance. The operational field trial involved 26 subjects in class IV SDN Jetisharjo.

Stage 9, final product revision, is the stage where final improvements are made to interactive multimedia based on the results of the operational field trial.

Stage 10, dissemination and implementation. This stage is carried out simply with a limited scope by presenting interactive multimedia to enhance the understanding of concepts and characters among elementary school teachers in class IV at SDN Demangan, SDN Giwangan, and SDN Jetisharjo in Yogyakarta City. Furthermore, general distribution is carried out by uploading interactive multimedia via the website, YouTube, and Google Drive.

Two data collection techniques and instruments are used: 1) data collection techniques through interviews, observations, questionnaires, scales, and documentation; 2) data collection instruments consist of instrument grids for media experts, material experts, observations, and class teacher interviews.

In the research conducted, data analysis techniques consist of two, namely, 1) preliminary study analysis consisting of observation, needs analysis, interviews, and documentation studies and 2) data analysis from the development process and feasibility of interactive multimedia products by media experts, material experts, teacher responses and student responses which will be converted into a scale of four according to Mansyur et al (2015) as follows.

Table 1. Guidelines Total Expert Assessment Media

Score interval	Value	Cetegory
$104,00 < \text{skor} \leq 128,00$	A	Very feasible
$80,00 < \text{skor} \leq 104,00$	B	Feasible
$56,00 < \text{skor} \leq 80,00$	C	Less feasible
$32,00 \leq \text{skor} \leq 56,00$	D	Not feasible

Table 1 illustrates the feasibility assessment guidelines for learning media based on the total score of the expert assessment results. The scores obtained are categorized into four levels of feasibility, each representing the quality of the media developed. If the media

obtains a score in the range of $104.00 < \text{score} \leq 128.00$, it is declared very feasible with a grade of A, meaning the media has fulfilled almost all assessment aspects, such as suitability to learning objectives, ease of use, visual appearance, and attractiveness for students. Furthermore, media with a score of $80.00 < \text{score} \leq 104.00$ is categorized as feasible with a grade of B, which means the media can be used with slight improvements in several minor aspects. Meanwhile, a score of $56.00 < \text{score} \leq 80.00$ is assigned a grade of C, indicating that the media requires significant revision before it can be implemented. Finally, if the score falls within the range of $32.00 \leq \text{score} \leq 56.00$, the media is categorized as not feasible, with a grade of D, indicating that many feasibility indicators have not been optimally met.

Table 2. Guidelines Total Expert Assessment Material

Score Interval	Value	Cetegory
$104,00 < \text{skor} \leq 128,00$	A	Very feasible
$80,00 < \text{skor} \leq 104,00$	B	Feasible
$56,00 < \text{skor} \leq 80,00$	C	Less feasible
$32,00 \leq \text{skor} \leq 56,00$	D	Not feasible

Table 2 serves as a guideline for assessing the feasibility of the developed learning materials. The results of the expert assessment of the materials are presented in four main categories based on the total score. Materials with a score in the range of $104.00 < \text{score} \leq 128.00$ receive a grade of A, categorized as very feasible. This indicates that the content aligns with the curriculum, is conceptually accurate, relevant to students' needs, and is presented in communicative and engaging language. If the material receives a score of $80.00 < \text{score} \leq 104.00$, it is categorized as feasible with a grade of B, indicating that the material is good but may still require minor revisions in certain aspects, such as content depth or presentation consistency. For a score of $56.00 < \text{score} \leq 80.00$, the material is considered less feasible with a grade of C, indicating that several aspects of the substance or presentation still need to be thoroughly improved to meet academic standards. Meanwhile, a score of $32.00 \leq \text{score} \leq 56.00$ is given a grade of D and is categorized as not feasible, indicating that the material does not meet the feasibility criteria in terms of both content and presentation.

According to the research conducted, interactive multimedia is considered feasible if it at least meets the 'Feasible' criteria. If it does not meet the 'Feasible' category, then revision and revalidation will be carried out until it meets the 'Feasible' category, as determined by media and material experts.

C. Result

The product developed is a technology-based learning medium, an interactive multimedia tool, designed for use by grade 4 students in elementary schools. Product development utilizes Borg and Gall's R&D procedure, which comprises 10 steps, explained in more detail below.

Research and Information Collection

Research and information collection activities aim to assess the initial conditions in each school and determine the extent to which users require interactive multimedia products. Information collection is conducted through various methods, including observation of learning activities, interviews, analysis of learning materials in elementary schools, needs assessments, and literature reviews.

Observations of learning activities were conducted in grade IV elementary schools across several schools in Yogyakarta City. Based on observations made during teachers' learning process in elementary schools, data were collected regarding the learning process, the utilization of learning media, and evaluations conducted by teachers on students' understanding of concepts and characters when implementing Pancasila education.

Interviews were conducted with teachers to explore their needs in using interactive multimedia. Based on the results of the interviews conducted, the school has implemented an independent curriculum, and the teachers who teach carry out learning in accordance with the applicable curriculum. However, the implementation in the field still found several obstacles, including teachers having difficulty creating a learning atmosphere that makes students enjoy learning.

A preliminary study conducted on December 5, 2024, collected various learning media documents available at the school. Teachers at the school have utilized the on-site learning media facilities. The media used included student and teacher books sourced from the government, as well as accompanying books, pictures, and maps. Some teachers utilize LCD projector technology, but it is primarily used to display images and is rarely employed for other purposes.

The needs analysis in this study was conducted to determine the level of teacher and student needs for interactive multimedia, to enhance students' understanding of concepts and characters. The needs questionnaire was distributed to 5 grade IV teachers and 101 grade IV students in several elementary schools in Yogyakarta City. A summary of the results of the needs analysis questionnaire is in the following table.

Table 3. Results of the Interactive Multimedia Needs Questionnaire

Subject	Category	Number of Students	Number of Teachers
Students and teachers	Really need	71	5
	Need	29	0
	Do not need	1	0
	Total	101	5

Based on the analysis and studies found in the literature study, the learning unit on building identity in diversity in Pancasila education was chosen as the material for the interactive multimedia product. The learning unit was chosen because the teacher found it difficult to convey the material, and it would be more engaging if it were developed into an interactive multimedia product.

Planning

Planning in the research conducted in the form of creating product development objectives, content structure analysis, learning objective analysis, learning design, planning document analysis, and learning resource analysis.

Determining the objectives of product development based on findings and the identification of problems that have been analyzed as initial needs in elementary schools. The following are the objectives of product development: 1) producing interactive multimedia products aimed at improving the understanding of concepts and characters of grade IV elementary school students in Yogyakarta City.

The planning carried out next determines the learning unit, specifically about building identity in diversity, which is based on material from Pancasila Education lessons. The selection of learning units in this study is based on choosing suitable and engaging materials when implemented in interactive multimedia. There is a significant amount of material in student books that needs to be completed, detailed, and clearly visualized so that students can understand the concepts presented in the existing material. The selection of learning objectives and learning outcomes is based on the flow of learning objectives in the independent curriculum.

The formulation of learning objectives and learning outcomes is carried out to facilitate the preparation of the learning flow. The material compiled based on learning objectives and achievements then becomes the basis for presenting the development of interactive multimedia products.

Planning documents, such as learning objective flows and teaching modules, are used to determine learning outcomes, strategies employed during learning, and learning implementation plans throughout the entire learning process.

The learning resources used are intended as the basis for developing interactive multimedia products. The learning resources in this study comprise teaching materials and supporting software used to create products. The teaching materials used are based on the learning objective flow, learning objectives, and learning outcomes. Supporting software used in product development includes Adobe Flash Player, Adobe Illustrator, Adobe Photoshop, and other supporting applications.

Initial Product Development

After distributing the needs questionnaire, the next activity is to analyze and develop interactive multimedia. The development is based on the instrument grids from the theoretical study and the learning objective flow, resulting in the creation of interactive multimedia.

The design of interactive multimedia products is chosen based on the determination of the elements to be displayed. Some of the elements selected include animation, images, sound, buttons, fonts, and other supporting elements. At the design stage, the product begins by analyzing the scope of the material, and then a flowchart and storyboard are prepared.

The development of the prepared product is aligned with the flowchart and storyboard that have been created. The learning unit in product development focuses on building identity in diversity, comprising four learning sessions with materials tailored to the progression of learning objectives and achievements outlined in the teaching module developed by the researcher.

The interactive multimedia product developed consists of a cover, main page, main menu, instructions for use, a menu provided in each learning material, which contains learning to improve understanding of concepts and character building, and other menus.

After development, the initial product will be assessed through product validation by media experts, namely Prof. Drs. Herman Dwi Surjono, M.Sc., MT., Ph.D., and material expert Prof. Wuri Wuryandani, M.Pd. Experts have assessed this product in several aspects. Media experts assess products based on aspects 1) appearance, 2) text, 3) video, 4) animation, 5) audio, 6) games, 7) programming, 8) navigation, and 9) Packaging. Material experts also assess the product based on aspects 1) the quality of learning materials, 2) the quality of learning design, and 3) the quality of the learning display. The results obtained will be supplemented with suggestions for products and values obtained using a four-scale conversion. The assessment of media experts and material experts in the research conducted is in the table below.

Table 4. Results of Media Expert Assessment on Interactive Multimedia Development

No	Aspect	Score	Value	Category
1	Display	10	A	Very feasible
2	Text	17	A	Very feasible
3	Video	13	B	Very feasible
4	Animation	7	A	Very feasible
5	Audio	10	A	Very feasible
6	Games	11	A	Very feasible
7	Programming	24	A	Very feasible
8	Navigation	11	A	Very feasible
9	Packaging	7	A	Very feasible
Total		110	A	Very feasible

Table 4 shows the assessment of media experts in several aspects, namely 1) display gets a score of 10 with an A value and the category obtained is 'very decent'; 2) text gets a score of 17 with an A value and the category obtained is 'very decent'; 3) video gets a score of 13 with a B value and the category obtained is 'decent'; 4) animation gets a score of 7 with an A value and the category obtained is 'very decent'; 5) audio gets a score of 10 with an A value and the category obtained is 'very decent'; 6) games get a score of 11 with an A value and the category obtained is 'very decent'; 7) programming gets a score of 24 with an A value and the category obtained is 'very decent'; 8) navigation gets a score of 11 with an A value and the category obtained is 'very decent'; 9) packaging gets a score of 7 with an A value and the category obtained is 'very feasible'; and the total assessment of media experts gets a score of 110 with an A value and the category obtained is 'very feasible'.

Interactive multimedia is described as 'Suitable for use in Pancasila education learning in grade IV of elementary school, with revisions according to suggestions of media experts.

Table 5. Results of Material Expert Assessment on Interactive Multimedia Development

No	Aspect	Score	Value	Category
1	Learning Material Quality	38	A	Very feasible
2	Learning Design Quality	36	A	Very feasible
3	Display Quality	16	A	Very feasible
	Total	90	A	Very feasible

Table 5 shows the assessment of material experts on several aspects, namely 1) the quality of learning materials gets a score of 38 with an A value, and the category obtained is 'very feasible'; 2) the quality of learning design gets a score of 36 with an A value and the category obtained is 'very feasible'; 3) the quality of the display gets a score of 16 with an A value and the category obtained is 'very feasible'; and the total assessment of material experts gets a score of 90 with an A value and the category obtained is 'very feasible.'

Interactive multimedia is deemed 'Suitable for use in Pancasila education learning in grade IV elementary school with revisions according to expert suggestions.' Based on the assessment of media and material experts, developing interactive multimedia products to enhance understanding of concepts and characters is deemed suitable for use in the next stage, with revisions made in accordance with the provided suggestions. In the initial product revision, suggestions were provided by expert judgment, including media experts and material experts. The suggestions provided by the experts were used as a basis for revisions during the preparation of the initial product.

Media and material experts evaluated the interactive multimedia to ensure its quality and feasibility. Media experts assessed technical and visual aspects, while material experts focused on content and instructional design. Both evaluations showed very feasible results. The comparative scores are presented in Figure 2.

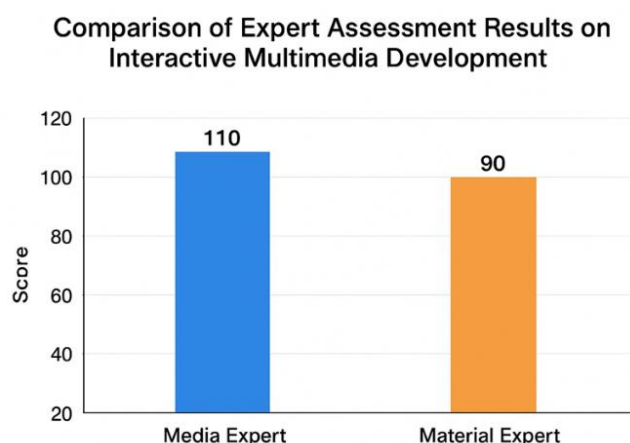


Figure 2. Comparison of Expert Assessment Results

The following are the characteristics of interactive multimedia before and after revision, as shown in Figures 3 and 4. The results of the initial product revision were used to carry out the initial field trial.



Figure 3. Culture Before Revision



Figure 4. Culture After Revision

Initial Field Trial

The initial field trial of product development was conducted at SD Negeri Demangan. The research was conducted in grade IV, with nine students serving as subjects in the initial field trial.

In the initial field trial stage, the research subjects used interactive multimedia in participating in Pancasila education learning in class. Each student was faced with a computer to operate the interactive multimedia directly and independently. The use of interactive multimedia by students was implemented over 2 weeks during the scheduled Pancasila education learning sessions. Based on this research, an analysis of student and teacher responses was produced when using interactive multimedia.

The student response scale was administered during the initial trial, when students completed learning about Pancasila education using interactive multimedia. The provision of responses by students aims to determine how much the value of the product's benefits

includes assessments of aspects of media, materials, learning, and language. The following are the results of the student response scale in the initial field trial.

Table 6. Student Response Scale Results in Initial Field Trial

No	Aspect	Score	Value	Category
1	Media	173	B	Feasible
2	Material	114	B	Feasible
3	Learning	146	B	Feasible
4	Language	29	B	Feasible
	Total	462	B	Feasible

Based on Table 6, the results of the student response scale on the media aspect got a score of 173 in the category of 'feasible'; the material aspect got a score of 114 in the category of 'feasible'; the learning aspect got a score of 146 with the category of 'feasible'; and the language aspect got a score of 29 with the category of 'feasible.'

Based on the results obtained, the student response to interactive multimedia is feasible for use in Pancasila education learning.

The teacher response scale is given when the teacher has finished testing the use of the product in Pancasila education learning using interactive multimedia. The provision of responses by the teacher aims to determine how much the product's benefits include assessments of aspects such as learning materials, presentation standards, language standards, readability, and multimedia display. The following are the results of the teacher response scale in the initial field trial.

Table 7. Teacher Response Scale Results in Initial Field Trial

No	Aspect	Score	Value	Category
1	Learning materials	27	A	Very feasible
2	Presentation standards	24	A	Very feasible
3	Language and readability standards	16	A	Very feasible
4	Multimedia display	27	A	Very feasible
	Total	94	A	Very feasible

Based on Table 7, the results of the teacher response scale on the learning material aspect get a score of 27 with the category of 'very feasible'; the presentation standard aspect gets a score of 24 with the category of 'very feasible'; the language and readability standard aspect gets a score of 16 with the category of 'very feasible'; and the multimedia display aspect gets a score of 27 with the category of 'very feasible.' Based on the results obtained, the teacher's response to the use of interactive multimedia is very feasible for use in Pancasila education learning.

Revision of Initial Field Trial Products

After the initial field trial was completed, teachers and students gave several suggestions. Therefore, revisions were made in accordance with suggestions and user input during the initial field trial. Here are some revisions that were made.

In the first material, there was an error in the display of the culture of the Province of Bali; the content of the material incorrectly listed the culture of the Province of Papua. It should also be replaced with material content for the province of Bali.

Some introductory texts to the material in the second material section were lacking. Therefore, it is necessary to complete the sentences so that students can understand the information more completely.

Based on the suggestions provided by teachers and students during the initial field trial, revisions were made to improve the interactive multimedia product, making it ready for use in the subsequent field trial.

Main Field Trial

The main field trial was conducted at Giwangan State Elementary School. The study was conducted with 18 research subjects who were grade IV students.



Figure 5. Implementation of the Main Field Trial

The analysis of the results from the main field trial, which involved students and teachers, is as follows. The student response scale sheet was given after students participated in Pancasila education learning using interactive multimedia. The following is a summary of the results of converting student response scores to interactive multimedia, as presented in Table 8.

Table 8. Results of the Student Response Scale in the Main Field Trial

No	Aspect	Score	Value	Category
1	Media	378	A	Very feasible
2	Material	241	A	Very feasible
3	Learning	314	A	Very feasible
4	Language	68	A	Very feasible

Total	1001	A	Very feasible
-------	------	---	---------------

Based on Table 8, the results of the student response scale on the media aspect got a score of 387 with the category 'very feasible'; the material aspect got a score of 241 with the category 'very feasible'; the learning aspect got a score of 314 with the category 'very feasible'; and the language aspect got a score of 68 with the category 'very feasible.'

Based on the results obtained, students' responses to interactive multimedia can be considered suitable for use in Pancasila education learning. The teacher response scale is given when the teacher has finished testing the use of the product in Pancasila education learning using interactive multimedia. The provision of responses by teachers aims to determine the value of the benefits of the developed product, including assessments of aspects such as learning materials, presentation standards, language standards, readability, and multimedia display. The following are the results of the teacher response scale in the main field trial.

Based on Table 9, the results of the teacher response scale on the learning material aspect get a score of 28 with the category 'very feasible'; the presentation standard aspect gets a score of 28 with the category 'very feasible'; the language standard and readability aspect gets a score of 16 with the category 'very feasible'; and the multimedia display aspect gets a score of 26 with the category 'very feasible.'

Table 9. Results of the Teacher Response Scale in the Main Field Trial

No	Aspect	Score	Value	Category
1	Learning materials	28	A	Very feasible
2	Presentation standards	28	A	Very feasible
3	Language and readability standards	16	A	Very feasible
4	Multimedia display	26	A	Very feasible
	Total	98	A	Very feasible

Based on Table 9, the results of the teacher response scale on the learning material aspect get a score of 28 with the category 'very feasible'; the presentation standard aspect gets a score of 28 with the category 'very feasible'; the language standard and readability aspect gets a score of 16 with the category 'very feasible'; and the multimedia display aspect gets a score of 26 with the category 'very feasible.'

Based on the results, the teacher's response to using interactive multimedia in the main field trial is feasible for use in Pancasila education learning.

Main Field Trial Product Revision

The revision was carried out after the main field trial was completed. At this stage, the teacher made only one suggestion, namely that some texts in the second material were in a small font, so they needed to be enlarged to make them more readable for students.

Based on the suggestions provided by the teacher during the main field trial, revisions were made to improve the interactive multimedia product, making it ready for use in the operational field test.

Operational Field Test

The operational field test was conducted at SD Negeri Jetisharjo, an experimental class with 26 students who served as the research subjects. The analysis of the results from the student and teacher response scales in the operational field test is as follows.

The student response scale sheet is given after students have participated in Pancasila education learning using interactive multimedia. The following table summarizes the results of converting student response scores to interactive multimedia, as shown in Table 10.

Table 10. Student Response Scale Results in the Operational Field Test

No	Aspect	Score	Value	Category
1	Media	572	A	Very feasible
2	Material	386	A	Very feasible
3	Learning	473	A	Very feasible
4	Language	98	A	Very feasible
	Total	1529	A	Very feasible

Based on Table 10, the results of the student response scale on the media aspect get a score of 572 with the category of 'very feasible'; the material aspect gets a score of 386 with the category of 'very feasible'; the learning aspect gets a score of 473 with the category of 'very feasible'; and the language aspect gets a score of 98 with the category of 'very feasible.' Based on the results obtained, student responses to the use of interactive multimedia are very feasible for use in Pancasila education learning.

The teacher response scale is given when the teacher has finished testing the use of the product in Pancasila education learning using interactive multimedia. The provision of responses by teachers aims to determine the extent to which the developed product benefits, assessing aspects such as learning materials, presentation standards, language standards, readability, and multimedia display. The following are the results of the teacher response scale in the main field trial.

Table 11. Results of the Teacher Response Scale in the Operational Field Test

No	Aspect	Score	Value	Category
1	Learning materials	28	A	Very feasible
2	Presentation standards	27	A	Very feasible
3	Language and readability standards	16	A	Very feasible
4	Multimedia display	28	A	Very feasible
	Total	99	A	Very feasible

Based on Table 11, the results of the teacher response scale on the learning material aspect got a score of 28 with the category of 'very feasible'; the presentation standard aspect got a score of 27 with the category of 'very feasible'; the language and readability standard aspect got a score of 16 with the category of 'very feasible'; and the multimedia display aspect got a score of 28 with the category of 'very feasible.' Based on the results obtained, the teacher's response to the use of interactive multimedia in the operational field test is feasible for use in Pancasila education learning.

Revision of Operational Field Test Products

The final revision was completed, and the scale was distributed after the operational field test was finished. At this stage, neither teachers nor students provided suggestions or input. Users were happy to use the interactive multimedia products developed by researchers. There were no revisions at this stage, and the products developed were ready to proceed to the next stage, namely dissemination.

Dissemination

The dissemination carried out by the researchers in this study was implemented through several strategies. First, seminars and training sessions were conducted for fourth-grade teachers at SD Negeri Demangan, SD Negeri Giwangan, and SD Negeri Jetisharjo to introduce and demonstrate the use of the developed interactive multimedia. Second, a tutorial video explaining how to operate the interactive multimedia was uploaded to YouTube to provide wider access for users who require guidance. Third, the interactive multimedia product was uploaded to Google Drive to ensure that it could be accessed and downloaded by anyone in need, particularly teachers and students.

The interactive multimedia developed in this research is able to support the Pancasila Education learning process, as it integrates various elements—such as music, dubbing, animation, engaging storylines, and visual illustrations—that can be utilized simultaneously according to students' preferences. These features contribute to a more engaging, interactive, and student-centered learning experience. To maximize accessibility, the multimedia product has been uploaded through several links so that teachers can easily obtain and use it as an enjoyable learning tool. Students can also download the media independently to support learning at home.

Despite its advantages, the product also has certain limitations. It requires a computer or laptop with at least Windows 7 operating system, equipped with a processor of a minimum 1 gigabyte capacity and 64-bit RAM, in order to operate properly.

D. Discussion

The results of this study indicate that the interactive multimedia developed for Pancasila Education learning is both feasible and useful, based on responses from both students and teachers (Alpizar et al., 2020; Sartono et al., 2022). In the main and operational field trials, student evaluations across media, material, learning, and language aspects

consistently fell within the "very feasible" category, demonstrating that the multimedia met the expectations for content quality, usability, and engagement (Surjono, 2017). Likewise, teachers' assessments confirmed the product's effectiveness, with high scores recorded in learning material, presentation standards, language readability, and multimedia display.

The absence of significant revisions during the final stage further strengthens the evidence that the multimedia product fulfilled user needs. The interactivity and positive feedback from both students and teachers highlight the product's ability to create a fun, interactive, and student-centered learning environment (Kumala et al., 2021; Sartono & Wulandari, 2020), which aligns with educational principles promoting active learning (Iskandar et al., 2023).

Overall, the interactive multimedia developed through this research provides a promising solution for enhancing Pancasila Education learning and demonstrates the importance of integrating technology in modern classroom practices (Sartono et al., 2022).

E. Implication

Theoretically, the results of this study contribute to strengthening multimedia learning theory by situating it within the context of Pancasila Education, thereby broadening the understanding of how multimedia-based learning principles can be integrated to shape national values and character. From a practical perspective, these findings guide teachers in implementing interactive multimedia as an effective means of developing students' character through meaningful, adaptive, and contextual learning experiences. Meanwhile, from a social and policy perspective, this study supports the implementation of the Merdeka Curriculum, which emphasizes differentiated learning and technology-based character education. It also serves as a basis for educational policymakers to develop digital strategies that align with the Pancasila values and the needs of the 21st century.

F. Limitation and Suggestion for Future Research

This study has several limitations that should be taken into consideration. Methodologically, the relatively small sample size may limit the generalizability of the findings to a broader population. Furthermore, this study did not include a long-term effectiveness test, so the sustainable impact of multimedia use in learning cannot be comprehensively determined. Therefore, future research is recommended to expand the scope of the trial to various regions with diverse social and cultural characteristics and involve schools with varying ability levels. This approach is expected to provide a more representative picture and strengthen the external validity of the effectiveness of multimedia-based learning models in the context of Pancasila education and the implementation of the Merdeka Curriculum.

G. Conclusion

The interactive multimedia product, developed in 10 stages by Borg & Gall, has been created and declared suitable for Pancasila Education learning in grade IV elementary schools with an independent curriculum.

This study developed and validated interactive multimedia for Pancasila Education, which was consistently rated 'very feasible' by experts, teachers, and students. It is effective to support learning in grade IV elementary schools under the Independent Curriculum.

Thus, the interactive multimedia developed is effective and ready to be used as a supporting medium in learning Pancasila Education in elementary schools. Future developments should consider creating lighter versions compatible with a wider range of devices, including mobile platforms, to ensure broader inclusivity and accessibility.

References

- Ahmad, N., Youjin, L., Žiković, S., & Belyaeva, Z. (2023). The Effects of Technological Innovation on Sustainable Development and Environmental Degradation: Evidence from China. *Technology in Society*, 72, 102184. <https://doi.org/10.1016/j.techsoc.2022.102184>
- Alpizar, D., Adesope, O. O., & Wong, R. M. (2020). A Meta-Analysis of Signaling Principle in Multimedia Learning Environments. *Educational Technology Research and Development*, 68(5), 2095–2119. <https://doi.org/10.1007/s11423-020-09748-7>
- Borg, W. R., & Gall, M. D. (1983). *Educational research: An introduction* (7th ed.). MA: A & B Publications.
- Ediyani, M., Hayati, U., Salwa, S., Samsul, S., Nursiah, N., & Fauzi, M. B. (2020). Study on Development of Learning Media. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, 3(2), 1336–1342. <https://doi.org/10.33258/BIRCI.V3I2.989>
- Fu, J. (2022). Innovation of Engineering Teaching Methods Based on Multimedia Assisted Technology. *Computers and Electrical Engineering*, 100, 107867. <https://doi.org/10.1016/J.COMPELECENG.2022.107867>
- Ibrahim, N. F. S. C., Farahkhanna, N., Shaari, M. R., & Mohd Ra'in Nallaluthan, K. (2021). Students' Perceptions of Interactive Multimedia Applications in the 21st Century Teaching and Learning Process. *Online Journal for TVET Practitioners*, 6(1).
- Iskandar, M. Y., Hendra, H., Syafril, S., Putra, A. E., Nanda, D. W., & Efendi, R. (2023). Developing Interactive Multimedia for Natural Science in High School. *International Journal of Multidisciplinary Research of Higher Education*, 6(3), 128–135. <https://doi.org/10.24036/ijmurhica.v6i3.127>
- Khyzhniak, I., Tsybulko, L., Viktorenko, I., & Mohyliova, N. (2021). Implementing The Theory of Multiple Intelligences onto Project-Based Multimedia Learning at Primary School. *Information Technologies and Learning Tools*, 82(2), 18–31. <https://doi.org/10.33407/itlt.v82i2.4326>

- Kumala, F. N., Ghuftron, A., Astuti, P. P., Crismonika, M., Hudha, M. N., & Nita, C. I. R. (2021). MDLC model for developing multimedia e-learning on energy concept for primary school students. *Journal of Physics: Conference Series*, 1869(1). <https://doi.org/10.1088/1742-6596/1869/1/012068>
- Mansyur, Z., Rasyid, H. &, & Suratno. (2015). *Asssemen Pembelajaran di Sekolah: Panduan bagi Guru dan Calon Guru*. Pustaka Pelajar.
- Mar'atussolichah, M., Ibda, H., Al Hakim, M. F., Faizah, F., Aniqoh, A., & Mahsun, M. (2024). Benkangen Game: Digital Media in Elementary School Indonesian Language. *Journal of Education and Learning (EduLearn)*, 18(2), 480–488. <https://doi.org/10.11591/edulearn.v18i2.21091>
- Nordesjö, K., Scaramuzzino, G., & Ulmestig, R. (2022). The Social Worker-Client Relationship in the Digital Era: A Configurative Literature Review. *European Journal of Social Work*, 25(2), 303–315. <https://doi.org/10.1080/13691457.2021.1964445>
- Praheto, B. E., Rohmadi, M., & Wardani, N. E. (2020). The Effectiveness of Interactive Multimedia in Learning Indonesian Language Skills in Higher Education. *Rupkatha Journal on Interdisciplinary Studies in Humanities*, 12(1), 1–11. <https://doi.org/10.21659/rupkatha.v12n1.34>
- Ross, J. (2022). *Digital Futures for Learning* (1st ed.). Routledge. <https://doi.org/10.4324/9781003202134>
- Samat, A., Mohamad, S., Abdul Aziz, & Azlina. (2020). The Effectiveness of Multimedia Learning in Enhancing Reading Comprehension Among Indigenous Pupils. *Arab World English Journal*, 11(2), 290–302. <https://doi.org/10.24093/awej/vol11no2.20>
- Santaria, R., Negeri, S., & Agama Islam Negeri Palopo, I. (2020). Dampak Pandemi Covid-19 terhadap Proses Pengajaran Bagi Guru dan Siswa. *Jurnal Studi Guru dan Pembelajaran*, 3(2), 289–295. <https://doi.org/10.30605/JS GP.3.2.2020.293>
- Sari, D. N. (2021). Implementation of Educative Learning Media Counting Tree to Improve Student's Cognitive Abilities in Kartika Tanjung Morawa Kindergarten. *Britain International of Linguistics Arts and Education (BIoLAE) Journal*, 3(1), 22–28. <https://doi.org/10.33258/BIOLAE.V3I1.406>
- Sartono, K. E., Ambarsari, R., & Herwin, H. (2022). Interactive Multimedia Based on Indonesian Cultural Diversity in Civics Learning in Elementary Schools. *Cypriot Journal of Educational Sciences*, 17(4), 1192–1203. <https://doi.org/10.18844/cjes.v17i4.7136>
- Sartono, K. E., Ilham, W., Herwin, H., Hendra, P., & Purnomo, Y. W. (2024). Feasibility of Interactive Multimedia Based on Indonesian Cultural Diversity in Learning Pancasila Education. *International Conference on Educational Research and Innovation*, 194–199.

- Sartono, & Wulandari, E. (2020). Pengembangan Media Kereta Budaya untuk Menanamkan Karakter Cinta Tanah Air Siswa Kelas IV SD. *Jurnal Teknologi Pendidikan*, 08(01), 62–82.
- Singh, M. N. (2021). Inroad of Digital Technology in Education: Age of Digital Classroom. *Higher Education for the Future*, 8(1), 20–30. <https://doi.org/10.1177/2347631120980272>
- Surjono, H. D. (2017). *Multimedia Pembelajaran Interaktif Konsep dan Pengembangan*. UNY Press.
- Vagg, T., Balta, J. Y., Bolger, A., & Lone, M. (2020). Multimedia in Education: What do the Students Think? *Health Professions Education*, 6(3), 325–333. <https://doi.org/10.1016/J.HPE.2020.04.011>
- Yorganci, S. (2022). The Interactive E-Book and Video Feedback in a Multimedia Learning Environment: Influence on Performance, Cognitive, and Motivational Outcomes. *Journal of Computer Assisted Learning*, 38(4), 1005–1017. <https://doi.org/10.1111/JCAL.12658>

Author's Biography

	Ilham Wahyudi, M.Pd.    He is a graduate with a Master's degree in Elementary Education. Ilham Wahyudi received his Master's degree in Elementary Education from Universitas Negeri Yogyakarta (UNY), Indonesia, and his Bachelor's degree from Universitas Negeri Malang (UM), Malang, Indonesia. He has written several papers on the application of local wisdom in schools, the development of digital multimedia, learning media, and ICT for learning. His research interests also include learning innovation, elementary education, and learning technology. Email: ilhamwahyudi.2021@student.uny.ac.id
	Dr. Sekar Purbarini Kawuryan, M.Pd.    She is a Master's degree graduate in Social Studies Education and holds a Doctoral degree in Elementary Education. Sekar Purbarini earned her Doctorate in Elementary Education from Yogyakarta State University (UNY), Indonesia. She has written several scientific papers in the field of social science education in elementary schools, including the development of learning media and the integration of local wisdom in instructional practices. Her research interests also include developments in the social sciences. Email: sekarpurbarini@uny.ac.id