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Pancasila Principles Interactive Media (MEINSIPA) with Games Using Scratch Programming for Elementary School Students

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Abstract: This study explores the implementation of Scratch software as an innovative learning medium for Pancasila education, aiming to enhance elementary students' understanding of Pancasila principles through interactive and engaging methods. Scratch, a user-friendly visual programming platform, enables students to create animations, games, and interactive stories, facilitating a more accessible and enjoyable learning experience. The research primarily investigates the effectiveness of Scratch-based media in improving students' comprehension of Pancasila values while fostering critical thinking and collaborative skills. Employing the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) instructional design model, the study systematically develops and validates the interactive media. Data were collected through observations, interviews, and questionnaires involving 17 sixth-grade students from SDN Lengkong Elementary School, alongside expert validations. The findings demonstrate that the Scratch-based interactive media, named MEINSIPA, effectively supports the delivery of Pancasila material, increasing student engagement and understanding. Moreover, the integration of interactive features such as quizzes and games aligns well with the learning objectives, promoting active participation and contextual application of Pancasila values. This research contributes to the growing body of knowledge on technology-enhanced learning in civic education and offers a practical alternative to conventional teaching methods, emphasizing the potential of digital tools to enrich moral and character education in elementary schools. The study underscores the importance of aligning instructional design with learner needs and highlights the role of innovative media in cultivating meaningful and lasting educational outcomes.

Keywords: Interactive media, ADDIE, Programming, Elementary School, Scratch

1. Introduction

Pancasila education plays a crucial role in shaping the character and moral values of students in Indonesia, serving as the foundational philosophy that guides the nation's social, political, and cultural life. It instills core principles such as belief in one God, humanitarianism, national unity, democracy, and social justice, which are essential for fostering responsible citizenship and ethical behavior among young learners. However, despite its importance, the implementation of Pancasila education in schools often faces significant challenges, particularly in engaging students effectively. Traditional teaching methods tend to be monotonous and lecture-based, which can diminish students' interest and motivation to learn (Klein et al., 2023; Ssemugenyi, 2023). This lack of engagement hinders the deep understanding and internalization of Pancasila values, limiting the impact of education on students' character development.

In the current digital era, where technology permeates every aspect of life, there is an increasing need to adopt interactive and technology-based learning approaches that resonate with students' experiences and preferences. Integrating digital tools into education can create more dynamic, stimulating, and meaningful learning environments that enhance student participation and motivation. Interactive media, such as educational games and multimedia applications, offer promising avenues to present complex concepts like Pancasila principles in ways that are accessible, relatable, and

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enjoyable for elementary school students. These approaches not only support cognitive learning but also encourage critical thinking, creativity, and collaboration, which are vital 21st-century skills (Thornhill-Miller et al., 2023).

One innovative platform that has gained attention in educational contexts is Scratch, a visual programming language designed to enable learners, especially children, to create interactive stories, games, and animations through simple drag-and-drop coding blocks. Scratch provides an engaging and user-friendly environment that fosters computational thinking and problem-solving skills while allowing students to express their creativity (Kyza et al., 2021; Ismail, Zaman & Mohammad, 2022). Its application in Pancasila education offers unique opportunities to teach the principles interactively and contextually, making abstract values tangible through digital projects. By integrating Scratch into Pancasila lessons, educators can transform traditional content into interactive experiences that promote deeper understanding and active learning. This approach aligns with contemporary educational goals of making learning more student-centered, meaningful, and connected to real-life contexts.

Moreover, the use of Scratch in Pancasila education supports the development of critical competencies beyond content knowledge. It encourages students to think critically about moral and social issues, collaborate with peers in project creation, and communicate ideas effectively through digital media. These skills are essential for nurturing well-rounded individuals capable of contributing positively to society. Therefore, adopting Scratch as a learning medium for Pancasila education not only enhances students' grasp of national values but also equips them with relevant skills for the digital age.

In summary, addressing the challenges of conventional Pancasila education requires innovative pedagogical strategies that leverage technology to engage and motivate students. Scratch programming emerges as a powerful tool to achieve this by providing an interactive platform that makes learning Pancasila principles more appealing, contextual, and effective. This study explores the potential of Scratch-based interactive media to enrich Pancasila education, aiming to foster both cognitive understanding and character development among elementary school students. The integration of technology in this domain represents a significant step toward modernizing civic education and preparing young learners for active, responsible citizenship in a rapidly evolving world (Bennett, 2013).

2. Literature Review

The integration of Scratch as a learning medium has garnered considerable attention in educational research, particularly for its potential to develop essential 21st-century skills such as critical thinking, collaboration, and creativity. Scratch is a visual programming language designed to simplify coding for children by using drag-and-drop blocks, enabling them to create interactive stories, games, and animations without prior programming experience. This accessibility makes Scratch an effective tool for engaging young learners in computational thinking and problem-solving activities, which are increasingly recognized as vital competencies in modern education (Montiel & Gomez-Zermeño, 2021).

In the context of Pancasila education, Scratch offers a novel approach to teaching moral and civic values by transforming abstract principles into interactive digital experiences. By allowing students to actively participate in creating projects that embody Pancasila values, Scratch facilitates deeper understanding and meaningful learning (Sulaiman et al., 2021; Franklin et al., 2020). This aligns with constructivist learning theories, which emphasize active engagement and knowledge construction through hands-on activities. Prior studies have demonstrated that Scratch-based learning media can significantly enhance students' motivation and comprehension in various subjects, including social studies and science, by making learning more dynamic and student-centered.

Moreover, Scratch supports the development of critical thinking by encouraging students to design, test, and debug their projects, fostering analytical skills and perseverance (Jiang & Li, 2021). Collaboration is also promoted as students often work in pairs or groups to share ideas and co-create projects, enhancing communication and teamwork abilities. Creativity flourishes as learners experiment with different sprites, backdrops, sounds, and coding sequences to express their ideas uniquely. These skills are essential not only for academic success but also for preparing students to navigate the complexities of the digital world and future workplaces (Selfa-Sastre et al., 2022).

Despite its advantages, the implementation of Scratch in educational settings faces challenges. Limited access to technology infrastructure, such as computers and reliable internet, can hinder widespread adoption, especially in under-resourced schools. Additionally, some teachers may lack sufficient training or confidence in using Scratch effectively, which can affect the quality of instruction and student outcomes. Addressing these challenges requires targeted professional development programs to equip educators with the necessary skills and pedagogical strategies for integrating Scratch into their curricula. Furthermore, the development of structured learning modules and instructional materials tailored to specific subjects, such as Pancasila education, can support teachers in delivering coherent and effective lesson.

Key features of Scratch that are particularly relevant to this study include sprites, backdrops, code blocks, and sounds. Sprites are the characters or objects that students can program to perform actions, enabling interactive storytelling and game creation. Backdrops serve as the background scenes, providing contextual settings for projects. Code blocks are the fundamental building units of Scratch programming, representing commands that control sprite behavior and interactions. Sounds add an auditory dimension, enhancing engagement and providing feedback. Mastery of these features allows students to create rich, multimedia learning experiences that can effectively convey educational content, such as the principles of Pancasila.

In summary, the literature underscores Scratch's potential as a versatile and powerful learning medium that not only supports content mastery but also cultivates critical 21st-century skills. Its application in Pancasila education represents an innovative step toward making moral and civic learning more interactive, relevant, and impactful for elementary students. However, successful implementation depends on overcoming infrastructural and pedagogical barriers through comprehensive teacher training and well-designed instructional resources. This study builds on these insights by developing and evaluating a Scratch-based interactive media tailored to Pancasila education, aiming to enhance both student engagement and understanding.

The Pancasila Principles Interactive Media, known as MEINSIPA, is an educational application developed using Scratch programming to support the teaching and learning of Pancasila values in elementary school. MEINSIPA is designed to transform the traditional delivery of Pancasila education into an engaging, interactive experience by integrating game-based learning elements that encourage active student participation. The application leverages Scratch's visual programming environment to create a dynamic platform where students can explore the principles of Pancasila through interactive games, quizzes, and multimedia content, making the learning process both practical and enjoyable.

MEINSIPA consists of 14 distinct backdrops, each serving as a different stage or thematic section within the application. These backdrops provide varied visual contexts that correspond to different aspects of the Pancasila principles, helping to maintain student interest and provide clear segmentation of content. The design incorporates multiple sprites—graphical characters or objects—that act as interactive agents within the media (Bailey & Konstan, 2000). These sprites include representations of Pancasila principals, teachers, navigation buttons (such as Start, Next, Back, Home), and quiz elements (True/False options). Each sprite is programmed with specific behaviors and responses to user inputs, enabling a seamless and intuitive user experience.

The overall design concept of MEINSIPA emphasizes clarity, interactivity, and educational relevance. The interface uses bright colors and intuitive icons to appeal to elementary students, while the interactive features such as quizzes and scenario-based games encourage critical thinking and application of Pancasila values in daily life. The media also incorporates feedback mechanisms to guide students through the learning process, reinforcing correct understanding and gently correcting misconceptions. For reference and further exploration, the MEINSIPA project is accessible online via the Scratch platform at: https://scratch.mit.edu/projects/1108971222. This link allows educators and students to interact directly with the media, providing transparency and opportunities for adaptation or further development.

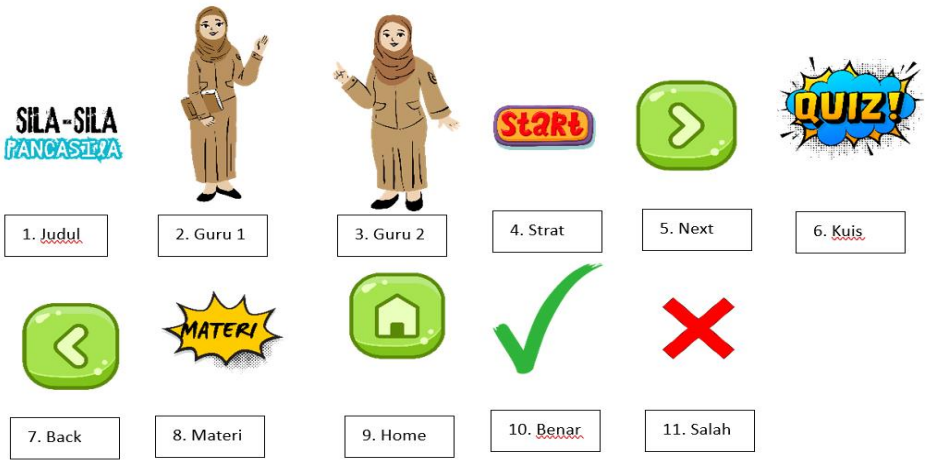

Fig. 1: Sprites used in MEINSIPA, including characters representing Pancasila principles, navigation buttons, and quiz options

By combining educational content with interactive digital media, MEINSIPA offers a promising alternative to conventional Pancasila teaching methods, fostering a more engaging and meaningful learning experience for elementary school students. This approach not only supports cognitive understanding but also encourages students to internalize and practice the values of Pancasila in their everyday lives.

3. Methodology

This study employed a research and development (R&D) approach utilizing the ADDIE instructional design model as the primary framework for creating and evaluating the interactive learning media MEINSIPA. The ADDIE model, widely recognized for its systematic and iterative process, consists of five sequential phases: Analysis, Design, Development, Implementation, and Evaluation. This model was chosen to ensure a structured development process that aligns educational objectives with learner needs and technological capabilities, thereby enhancing the effectiveness and usability of the learning media.

The ADDIE model guided the entire research process, beginning with a thorough analysis of the learning context and culminating in the evaluation of the developed media's effectiveness. Each phase was carefully executed to maintain coherence between the instructional design and the empirical findings presented in the results and discussion sections. The development of the MEINSIPA interactive media for teaching Pancasila principles to elementary students followed the ADDIE model, encompassing five phases: Analysis, Design, Development, Implementation, and Evaluation. In the Analysis phase, learning needs, challenges, and objectives were identified through interviews with teachers and observations, focusing on students' motivation, prior knowledge, and learning preferences to ensure the media addressed actual educational requirements. The Design phase involved outlining learning objectives, content structure, and interactive features, with storyboards and prototypes created using Scratch and supplementary design tools to visualize the user interface, navigation flow, and educational activities, emphasizing alignment with curriculum standards and age-appropriate content. During the Development phase, the actual creation of the interactive media took place, utilizing Scratch programming to build animations, code interactive elements, and integrate multimedia components, with continuous testing and refinement conducted to address technical issues and incorporate expert feedback, ensuring the media met quality standards and educational goals. In the Implementation phase, the developed media was introduced to 17 sixth-grade students at SDN Lengkong Elementary School, allowing researchers to observe usability, engagement, and initial learning outcomes in a controlled learning environment. Finally, the Evaluation phase assessed the media's effectiveness through quantitative and qualitative methods, including questionnaires administered to students and teachers, direct observations of learning sessions, and documentation of student performance on quizzes embedded within the media, focusing on measuring improvements in students' understanding of Pancasila principles, engagement levels, and the media's usability.

The study's participants comprised 17 students enrolled in grade VI at SDN Lengkong Elementary School, selected to represent the target demographic for the MEINSIPA media. Additionally, three experts in educational media, Pancasila education, and instructional design were consulted to validate the content and design of the media. Data collection for evaluating the MEINSIPA media's impact utilized multiple instruments to ensure a comprehensive assessment. Structured questionnaires were administered to both students and teachers to gather insights into the media's usability, engagement, and educational value. Systematic observations were conducted during media sessions to monitor student interactions, engagement levels, and behavioral responses. Additionally, documentation of student quiz results and feedback was maintained to analyze learning outcomes and identify areas for improvement.

The collected data were analyzed using a combination of quantitative and qualitative descriptive techniques to provide a nuanced understanding of the media's effectiveness. Data analysis for evaluating the MEINSIPA media's impact employed both quantitative and qualitative methods to provide a comprehensive assessment. Quantitative analysis involved statistically examining student quiz scores and questionnaire responses to determine learning gains and satisfaction levels. Descriptive statistics such as means, percentages, and frequency distributions were used to summarize the data, offering measurable insights into student performance and perceptions. Qualitative analysis focused on thematic examination of observational notes and open-ended questionnaire responses to identify patterns related to student engagement, usability issues, and instructional effectiveness. Additionally, expert feedback was qualitatively analyzed to inform media refinement, ensuring the educational tool met its intended objectives and addressed user needs.

4. Results

The methodology's comprehensive design ensured that the data collected directly informed the results and discussion sections. The iterative nature of the ADDIE model allowed for continuous refinement based on empirical evidence, expert validation, and user feedback. This alignment is evident in the presentation of expert opinions, student engagement metrics, and learning outcomes, which collectively demonstrate the media's effectiveness and areas for enhancement. The methodological rigor supports the study's conclusions regarding the suitability of Scratch-based interactive media for Pancasila education and provides a replicable framework for similar educational technology developments.

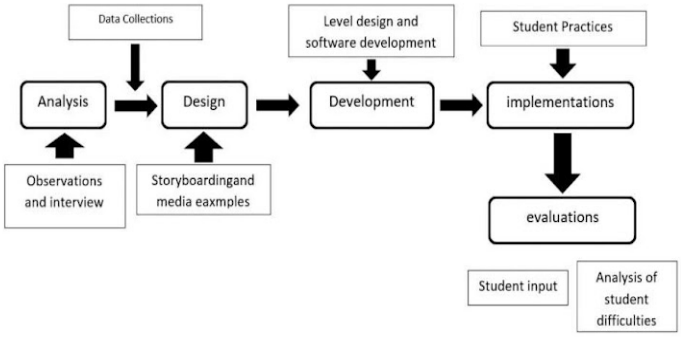

Fig. 2: The ADDIE model development procedure illustrating the cyclical phases of analysis, design, development, implementation, and evaluation

4.1 Analysis Phase

The analysis phase serves as the foundational step in the development of the MEINSIPA interactive media, focusing on identifying the core objectives, challenges, and contextual factors that influence the design and implementation of the learning tool (Mlitwa & Wanyonyi, 2015). This phase is critical to ensure that the media addresses real educational needs and aligns with the specific requirements of the target learners—sixth-grade elementary students studying Pancasila principles.

At the outset, the primary objective was to develop a mobile application that effectively conveys the values and principles of Pancasila in a manner that is engaging, accessible, and pedagogically sound. Recognizing that traditional methods of teaching Pancasila often struggle to capture students' interest, the analysis emphasized the need for creativity and uniqueness in the learning process. This approach aims to transform abstract civic concepts into interactive experiences that resonate with young learners, thereby fostering deeper understanding and meaningful internalization of national values.

To gather relevant data, the research team conducted in-depth interviews with teachers at SDN Lengkong Elementary School, who provided valuable insights into students' learning behaviors, motivational levels, and visual preferences. These interviews helped identify key challenges faced in the classroom, such as limited student engagement, varying levels of prior knowledge, and the need for instructional materials that accommodate diverse learning styles. Teachers highlighted the importance of incorporating interactive elements and multimedia to sustain attention and facilitate comprehension, especially for complex moral and social concepts embedded in Pancasila.

Furthermore, the analysis underscored the pervasive role of Pancasila principles across various educational phases, emphasizing their integration not only as theoretical content but also as practical guidelines for daily behavior and social interaction. This holistic perspective informed the design of MEINSIPA to include scenarios and activities that connect Pancasila values with students' everyday experiences, thereby enhancing relevance and applicability.

The data collected during this phase also revealed infrastructural considerations, such as the availability of technological resources and students' familiarity with digital tools, which influenced the choice of Scratch as the development platform. Scratch's user-friendly interface and visual programming environment were deemed suitable for elementary students, supporting both learning objectives and technical feasibility. In summary, the analysis phase provided a comprehensive understanding of the educational context, learner needs, and instructional challenges (Kaewpet, 2009). It established a clear framework for the subsequent design and development stages, ensuring that MEINSIPA would be tailored to effectively support Pancasila education through innovative, interactive, and student-centered learning experiences. This phase laid the groundwork for creating a media product that is not only pedagogically effective but also engaging and accessible to its intended users.

4.2 Design Phase

The design phase marks a critical stage in the development of the MEINSIPA interactive media, focusing on translating the insights and requirements identified during the analysis phase into a concrete, structured blueprint for the learning tool. This phase involves the careful selection and organization of educational content, the conceptualization of user interface elements, and the creation of detailed storyboards and prototypes that guide the subsequent development process. The primary goal is to ensure that the media aligns with the learning objectives of Pancasila education while providing an engaging, age-appropriate, and pedagogically sound experience for elementary school students.

Central to the design process was the alignment of learning materials with the specific goals of the Pancasila curriculum for grade VI students. The design team meticulously selected content that not only covers the fundamental principles of Pancasila but also integrates examples and scenarios relevant to students' daily lives. This contextualization aims to facilitate meaningful learning by connecting abstract values to practical applications, thereby enhancing comprehension and retention. The learning objectives were clearly defined to emphasize both cognitive understanding and the development of critical thinking and collaborative skills, consistent with 21st-century educational priorities.

To visualize and organize the media's structure, the team developed comprehensive storyboards that mapped out the user journey through the application. These storyboards detailed the sequence of screens, interactive elements, and educational activities, ensuring a logical flow that supports progressive learning. Each storyboard frame included annotations on content presentation, user interactions, and feedback mechanisms, providing a clear guide for developers and designers. This approach facilitated early identification of potential usability issues and content gaps, allowing for iterative refinement before full-scale development.

The design phase also involved the creation of visual assets and interface components using a combination of software tools. Scratch was employed as the primary platform for prototyping interactive elements, leveraging its drag-and-drop programming environment to simulate user interactions and game mechanics. For graphic design and image creation, Canva was utilized to produce custom sprites, backdrops, and icons that are visually appealing and thematically consistent with Pancasila values. This combination of tools enabled the design team to balance technical feasibility with aesthetic quality, ensuring that the media would be both functional and engaging. Scriptwriting for instructional content and user prompts was conducted using Microsoft Office tools, which facilitated the drafting, editing, and formatting of

textual materials. The scripts were crafted to use clear, concise, and age-appropriate language, supporting comprehension and maintaining student interest. Special attention was given to the tone and style to ensure that instructions and narratives were friendly yet formal enough to uphold academic standards.

A detailed prototype design table was developed to document the various backdrops and their corresponding functions within MEINSIPA. Table 1 serves as a reference for both developers and evaluators, outlining the purpose and content of each screen to maintain coherence and consistency throughout the media. The backdrops include the main menu, introductory pages with greetings and questions, material selection menus, instructional content on the five precepts of Pancasila, navigation interfaces, and quiz sections designed to assess student understanding. Each backdrop is carefully designed to facilitate smooth navigation and reinforce learning objectives through interactive and multimedia elements.

Table 1: Prototype Design MEINSIPA

Backdrop	Description
Main Page	Features a START button that directs students to the next page, serving as the entry point
Introduction Page	Contains greetings and questions related to the material, allowing students to input answers
Material/Quiz Selection Menu	Offers students the choice to select learning materials or quizzes according to their preference
Pancasila Principles Content	Presents detailed explanations of the first to fifth precepts, accompanied by practical examples
Navigation Interface	Includes back, home, and next buttons for easy movement between pages and sections
Quiz Page	Contains five questions on Pancasila principles, with scoring based on correct answers

This structured design ensures that MEINSIPA provides a comprehensive and interactive learning experience, guiding students through content acquisition, practice, and assessment in a coherent manner. The design phase's emphasis on user-centered principles, educational alignment, and multimedia integration lays a strong foundation for the subsequent development phase, where these plans are actualized into a functional and effective learning media.

4.3 Development Phase

The development phase represents the critical stage where the conceptual designs and plans formulated during the previous phases are transformed into a tangible, functional learning media. In this study, the development of the MEINSIPA interactive media was carried out using Scratch as the primary platform, chosen for its accessibility, visual programming environment, and suitability for elementary school learners. This phase involved a series of meticulous steps including animation creation, coding, graphic design, and iterative prototype testing to ensure the media's quality, usability, and educational effectiveness.

Initially, the development team translated the storyboard and design specifications into Scratch projects by creating and programming sprites, backdrops, and interactive elements. Animations were crafted to visually represent the Pancasila principles and related scenarios, enhancing student engagement through dynamic and colorful presentations. Each sprite was programmed with specific behaviors using Scratch's block-based coding system, enabling interactive responses such as navigation controls, quiz interactions, and feedback mechanisms. The coding process required careful attention to logic flow, event handling, and user input validation to create a seamless and intuitive user experience.

Graphic design played a vital role in this phase, as visual appeal and clarity are essential for maintaining the interest of young learners. Custom sprites and backdrops were designed or adapted to align with the thematic content of Pancasila education, ensuring that imagery was culturally relevant and age-appropriate. The development team utilized external graphic design tools to create high-quality images, which were then imported into Scratch to enrich the media's visual environment. Sound effects and background music were also incorporated to provide auditory feedback and enhance immersion, further supporting multisensory learning.

A key aspect of the development phase was the continuous testing and refinement of the prototype (Schork & Kirchner, 2018). The team conducted iterative usability tests to identify and resolve technical issues, improve navigation flow, and optimize interactive features. Feedback from educational experts and potential users was systematically collected and analyzed to guide modifications. For example, expert reviewers suggested adjustments to game mechanics to better align with learning objectives and to simplify certain coding sequences for smoother performance. These recommendations led to revisions in the coding structure and interface design, ensuring that the final product was both pedagogically sound and user-friendly.

The development process emphasized maintaining a balance between educational rigor and engaging gameplay. The coding of quiz functions, scoring systems, and interactive scenarios was carefully calibrated to provide meaningful

assessment opportunities while keeping students motivated. The media's modular design allowed for easy updates and scalability, enabling future enhancements or adaptations to different educational contexts.

To illustrate the coding structure and sprite functionalities, Figure 4 presents the labeled code sprites used in MEINSIPA. Each sprite corresponds to a specific role within the media, such as representing Pancasila principles, serving as navigation buttons (Start, Next, Back, Home), or functioning as quiz response options (True, False). This visual mapping aids in understanding the organization and interaction logic embedded within the Scratch project.

Fig. 3: Code sprites in MEINSIPA: (A) Pancasila Principles; (B) Teacher; (C) Start; (D) Material; (E) Next; (F) Home; (G) Back; (H) Quiz; (I) True; (J) False

Overall, the development phase successfully transformed the design blueprint into a fully operational interactive media that integrates educational content with engaging digital features. The iterative process of coding, graphic design, and expert-informed refinement ensured that MEINSIPA meets the intended learning goals while providing an enjoyable and accessible platform for elementary students to explore and internalize the principles of Pancasila. This phase laid the groundwork for subsequent implementation and evaluation, where the media's impact on student learning and engagement would be systematically assessed.

5. Discussion

To ensure the validity and reliability of the MEINSIPA interactive media, expert interviews were conducted with three professionals possessing extensive experience in educational media development, Pancasila education, and instructional design. These experts were selected based on their academic backgrounds and practical expertise, providing a comprehensive evaluation of the media's content accuracy, pedagogical appropriateness, and technical quality. The panel consisted of three experts. Expert 1 (R1) was a male faculty lecturer specializing in teacher training and education within the Department of Mathematics at UMK. Expert 2 (R2) was a male vocational college engineering expert, well-versed in educational technology. Expert 3 (R3) was a female elementary school teacher at SDN Lengkong, with a focus on Pancasila education and the development of learning media. The expert interviews were structured into three parts, focusing on different aspects of the media's design and functionality. Part A explored the experts' backgrounds and their perspectives on the educational context. Part B addressed content-related questions about the Scratch media's suitability for conveying Pancasila principles to elementary students. Part C solicited suggestions for improving the media's interactive features and overall effectiveness.

The experts unanimously agreed that the Scratch-based MEINSIPA media is generally appropriate for elementary school students, particularly due to its use of interactive animations and simple language that align well with the cognitive levels of grade VI learners. However, they recommended enhancing the narrative elements by adding more specific explanations for each Pancasila symbol to facilitate easier comprehension. This would help students grasp the nuanced meanings behind the principles more effectively. Regarding the media's ability to connect Pancasila principles with daily life, experts acknowledged that MEINSIPA successfully illustrates these relationships through scenario-based content. Nonetheless, they suggested incorporating additional interactive simulations or quizzes to encourage more active student participation and deepen understanding of the principles' real-world relevance.

In terms of student engagement, the experts found the media sufficiently interesting, highlighting the dynamic visuals and sound effects as key motivators. They noted, however, that some graphical elements could be improved to better reflect the Pancasila theme, such as integrating more contextual symbols and culturally relevant imagery to strengthen thematic coherence. The interface design was praised for its child-friendly features, including bright colors and intuitive icons, which facilitate ease of navigation. Experts cautioned against overcrowding the visual elements to maintain student focus on the learning material, recommending a balanced layout that avoids distractions.

Finally, the experts recognized the potential of MEINSIPA as an evaluative tool for assessing students' understanding of Pancasila values. They emphasized the importance of adding assessment features such as multiple-choice questions or interactive tasks, which would enable teachers to monitor learning progress more effectively and provide targeted feedback as presented in Table 2.

Table 2: Summary of expert feedback

Questions	Expert View Summary
Is the Scratch media appropriate for elementary students in conveying Pancasila values?	Generally appropriate due to interactive animations and simple language; recommend adding more specific narratives
Can the media help students understand the connection between Pancasila principles and daily life?	Yes, through scenarios; suggest adding interactive quizzes or simulations for deeper engagement
How engaging is the media for students?	Sufficiently engaging with dynamic visuals and sounds; some graphics could be improved for thematic relevance
Is the interface design child-friendly and adequate for learning?	Yes, with bright colors and intuitive icons; caution against visual overcrowding to maintain focus
Does the media have potential as an evaluation tool for student understanding?	Yes, with the addition of assessment features like quizzes or interactive tasks to facilitate teacher evaluation

In the third part of the interviews, experts provided valuable recommendations to further improve MEINSIPA's effectiveness. They emphasized that interactive features such as quizzes, games, and simulations must be thoughtfully designed to be both engaging and aligned with the learning objectives. For example, for the second Pancasila principle "Just and Civilized Humanity"—experts suggested incorporating role-playing games that teach empathy, allowing students to practice values through realistic scenarios. Experts also stressed the importance of tailoring content to the cognitive abilities of elementary students, particularly those in lower and middle grades. They recommended using simple stories, clear visual illustrations, and straightforward animations to ensure accessibility and comprehension. Conciseness and relevance to students' daily experiences were highlighted as critical factors in content design.

Furthermore, experts advised conducting trials with actual students to verify that the content and interactive elements are well understood and effectively support learning. This iterative testing would help identify any misunderstandings or usability issues, enabling continuous refinement. To enhance usability, experts proposed adding storytelling elements or analogies that simplify complex concepts, as well as audio guides or step-by-step explanatory texts to assist students in navigating the media. These additions would make the application more accessible, especially for students with varying learning styles or limited prior knowledge.

The expert validation process aligns closely with the methodology outlined in the ADDIE model's evaluation phase. The use of expert interviews complements student observations and questionnaire data, providing a multi-faceted assessment of MEINSIPA's educational value and usability. The feedback gathered informed iterative improvements during the development phase, ensuring that the media not only meets pedagogical standards but also addresses practical classroom needs. This alignment reinforces the study's rigor and supports the credibility of the findings presented in subsequent sections.

The interactive features embedded within the MEINSIPA media—such as quizzes, games, and simulations—have demonstrated significant effectiveness in enhancing elementary students' understanding of Pancasila values. Experts emphasized that these features, when thoughtfully designed, serve not only to engage students but also to reinforce learning objectives by providing active, hands-on experiences that encourage critical thinking and contextual application. The incorporation of interactive quizzes, for instance, allows students to test their knowledge in real time, receive immediate feedback, and identify areas requiring further study, thereby fostering a more personalized and reflective learning process.

Moreover, the use of game-based elements within MEINSIPA transforms the learning environment into a dynamic space where students are motivated to participate actively rather than passively absorb information. This gamification approach aligns well with contemporary educational theories that advocate for learner-centered and experiential learning,

particularly for younger audiences who benefit from visual and kinesthetic stimuli. The experts noted that such interactive activities help bridge the gap between abstract Pancasila principles and their practical relevance in students' daily lives, making moral and civic education more tangible and meaningful.

Customization of content to suit the cognitive levels of elementary students, especially those in lower and middle grades, was highlighted as a critical factor in the media's success. Experts recommended that the learning materials be presented through simple stories, clear visual illustrations, and straightforward animations that resonate with young learners' developmental stages. This approach ensures that complex concepts are broken down into manageable, relatable segments, facilitating comprehension and retention. The use of narrative elements and analogies was particularly encouraged to contextualize Pancasila values within familiar scenarios, thereby enhancing students' ability to internalize and apply these principles.

The importance of conducting trials with actual students was also underscored to verify the clarity and effectiveness of the content and interactive features. Such pilot testing enables developers and educators to observe student engagement, identify potential misunderstandings, and gather feedback for iterative improvements. This process ensures that the media is not only theoretically sound but also practically effective in diverse classroom settings. Additionally, experts recommended augmenting MEINSIPA with storytelling components, audio guides, and clear step-by-step instructions to support varied learning styles and improve accessibility. Audio narration can aid students who struggle with reading or who benefit from auditory learning, while explicit guidance helps users navigate the media confidently, reducing cognitive load and frustration. These enhancements contribute to a more inclusive and user-friendly learning environment.

In summary, the integration of well-designed interactive features within MEINSIPA significantly contributes to the effective teaching and learning of Pancasila values. By combining engaging activities with age-appropriate content and supportive instructional elements, the media fosters a deeper understanding and appreciation of national principles among elementary students. These findings reinforce the potential of Scratch-based educational tools to transform civic education into an interactive, relevant, and impactful experience that prepares young learners for responsible citizenship in a digital age.

6. Conclusion

The findings of this study clearly indicate that interactive features embedded within Scratch-based learning media, such as quizzes, games, and simulations, can significantly enhance the effectiveness of Pancasila education for elementary school students when thoughtfully designed and aligned with learning objectives. These interactive elements not only increase student engagement but also facilitate active learning by encouraging critical thinking, contextual application, and collaborative problem-solving. The use of Scratch as a platform provides a versatile and accessible environment that supports the creation of meaningful, age-appropriate educational experiences. A key insight from the research is the suitability of simple instructional approaches—such as storytelling, visual illustrations, and animations—for conveying complex moral and civic concepts to young learners. These methods help break down abstract Pancasila principles into relatable, concrete examples that resonate with students' daily lives, thereby fostering deeper understanding and internalization. The integration of clear narratives and concise explanations further aids comprehension, making the learning process more effective and enjoyable.

Moreover, the necessity of conducting student trials emerged as a critical factor in ensuring that the media meets learners' needs and facilitates genuine understanding. Such trials provide valuable feedback on usability, content clarity, and engagement, enabling iterative refinement of the media to better support diverse learning styles and abilities. This iterative process strengthens the alignment between instructional design and actual learning outcomes. Overall, the MEINSIPA application demonstrates considerable promise as an innovative educational tool that not only improves students' grasp of Pancasila principles but also nurtures their creativity and technological skills through the use of Scratch programming. By combining interactive digital media with sound pedagogical strategies, MEINSIPA offers a compelling alternative to traditional teaching methods, contributing to more meaningful and lasting civic education. This study underscores the potential of technology-enhanced learning to transform moral education into an engaging, relevant, and impactful experience for elementary students, preparing them to embody the values of Pancasila in their everyday lives.

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Conflict of Interest

The authors declare no conflicts of interest.

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