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ORIGINAL RESEARCH PAPER

Developing Wordwall-based Pancasila education learning game to improve the students' responsibility character and learning outcomes

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Abstract
Development of innovative learning media is essential for strengthening students' responsibility character and improving learning outcomes in Pancasila Education. This study aimed to (1) develop Wordwall-based game learning media, (2) examine its validity, (3) evaluate its practicality, and (4) determine its effectiveness in improving the responsibility character and learning outcomes of sixth-grade elementary school students. This study employed a Research and Development (R&D) approach using the ADDIE model and involved 28 sixth-grade students at UPT SPF SD Negeri Kakatua, a public elementary school in Makassar, South Sulawesi, Indonesia. The developed learning media consisted of four curriculum-based learning topics, four interactive Wordwall game activities, student worksheets, and media usage instructions integrated into a comprehensive instructional package. The interactive learning activities were designed to encourage active participation, independent learning, and the development of students' responsibility character through meaningful game-based learning experiences. The results indicated that the developed media met the criteria of validity, practicality, and effectiveness. Expert validation confirmed that the media was highly feasible for classroom implementation. Teacher and student responses demonstrated excellent practicality, while students' responsibility character and learning outcomes improved after using the media. The paired-samples t-test revealed a statistically significant difference between pretest and posttest scores, and the N-gain analysis indicated meaningful learning improvement. These findings demonstrate that the developed Wordwall-based learning media effectively enhances both students' responsibility character and learning outcomes. Therefore, it can serve as an innovative instructional alternative to support meaningful learning and character education in elementary Pancasila education.

Keywords: learning outcomes, Pancasila education, responsibility character, Wordwall-based learning game

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INTRODUCTION

Pancasila education is a compulsory subject in Indonesian elementary schools that aims to develop students' civic knowledge, character, and responsible behavior in accordance with the values of Pancasila. Besides promoting cognitive understanding, the subject plays an essential role in fostering responsibility, discipline, cooperation, critical thinking, and active participation in social life. As part of character education, Pancasila Education prepares students to become responsible citizens who are able to apply moral values in their daily lives and contribute positively to society (Usmi & Samsuri, 2022; Parhan & Sukaenah, 2020; Saputra et al., 2023).

Responsibility is one of the fundamental character values that should be developed from an early age because it influences students' learning attitudes, self-discipline, academic achievement, and social behavior. Students who demonstrate responsibility tend to complete assignments on time, obey classroom rules, participate actively in learning activities, and take ownership of their learning outcomes (Susanti & Prahastiwi, 2025; Bureau et al., 2022). In the Indonesian educational context, character education is closely associated with religious values that encourage students to become responsible, ethical, and accountable individuals. Therefore, the present study also refers to the perspective of Islamic education, which emphasizes responsibility as an essential moral value in learning and everyday life. This perspective is reflected in the Qur'an:

وَلَا تَقْفُ مَا لَيْسَ لَكَ بِهِ عِلْمٌ ۚ إِنَّ السَّمْعَ وَالْبَصَرَ وَالْفُؤَادَ كُلُّ أُولَٰئِكَ كَانَ عَنْهُ مَسْئُولًا

"And do not pursue that of which you have no knowledge. Indeed, the hearing, the sight, and the heart, all of those will be questioned." (Qur'an 17:36)

This verse emphasizes that every individual is accountable for his or her knowledge, decisions, and actions. In the context of education, students are expected to learn responsibly, complete academic tasks honestly, and apply moral values in their daily lives. These principles are consistent with the objectives of Pancasila Education, which seeks to develop responsible citizens with strong moral character and active civic participation (Saputra et al., 2023; Usmi & Samsuri, 2022).

Observations and needs analysis conducted in January 2026 at UPT SPF SD Negeri Kakatua, a public elementary school in Makassar, South Sulawesi, Indonesia, revealed several problems in sixth-grade Pancasila education learning. Approximately 57% of students frequently submitted assignments late, indicating weaknesses in time management and task responsibility. Classroom observations further showed that many students were reluctant to participate actively in discussions, depended heavily on teacher guidance when completing learning activities, and demonstrated limited initiative in completing tasks independently. In addition, 15 of the 28 students (53.57%) failed to achieve the school's minimum passing grade of 80, with a class average score of only 68. Learning activities also remained predominantly teacher-centered, with limited use of interactive instructional media. Consequently, students tended to become passive during classroom learning, which negatively affected both the development of responsibility character and learning outcomes. These findings indicate the need for innovative instructional media that can promote active participation, independent learning, and responsibility while improving academic achievement.

One instructional medium that has received considerable attention is Wordwall, an interactive digital platform that enables teachers to design game-based learning activities through quizzes, matching exercises, maze games, random wheels, and other interactive templates. The platform provides immediate feedback and automatic assessment, encouraging students to participate actively throughout the learning process. Interactive digital learning environments have been widely recognized as effective tools for increasing students' engagement and facilitating meaningful learning experiences (Mayer, 2021; Clark & Mayer, 2016; Celik & Baturay, 2024).

Previous studies consistently reported that Wordwall improves students' learning motivation, classroom participation, learning outcomes, and critical thinking skills. Safitri et al. (2022) and Fariza et al. (2026) found that Wordwall-based digital games significantly increased students' motivation during classroom learning. Similarly, Husna and Kusumadewi (2025) demonstrated that Wordwall effectively improved students' motivation in Pancasila Education. Khoiriyah et al. (2025) also reported that interactive Wordwall activities increased students' engagement during classroom instruction, while Lisandra et al. (2025) concluded that Wordwall

contributed to higher motivation, critical thinking skills, and academic achievement. Comparable findings were also reported by Rahmawati and Suryani (2022) who showed that interactive learning media improve students' participation and learning outcomes.

The effectiveness of Wordwall can also be explained through the principles of multimedia learning and gamification. Multimedia learning theory states that students learn more effectively when instructional materials combine text, images, audio, and interactive activities in an integrated manner (Mayer, 2008; Mayer, 2021). Likewise, gamification incorporates game elements into educational activities to increase learners' motivation, engagement, persistence, and enjoyment during learning (Deterding et al., 2011; Prensky, 2001). Previous studies further indicated that digital instructional media designed according to multimedia principles significantly improve students' understanding and retention of learning materials (Clark & Mayer, 2016; Milanti et al., 2023).

In addition to digital interaction, contextual instructional materials also contribute to meaningful learning experiences. Dewi and Setiawan (2022) emphasized that learning media presenting Pancasila values through attractive visual representations facilitate students' conceptual understanding. Firdaus et al. (2025) reported that digital learning media integrating meaningful learning activities support both cognitive achievement and character development. In addition to digital interaction, contextual instructional materials also contribute to meaningful learning experiences. Dewi and Setiawan (2022), in their research on digital comic media in Mimbar PGSD Undiksha, emphasized that learning media presenting Pancasila values through attractive visual representations facilitate students' conceptual understanding. Firdaus et al. (2025) reported that digital learning media integrating meaningful learning activities support both cognitive achievement and character development. Well-designed digital learning media have been shown to enhance students' engagement and conceptual understanding across a range of elementary school subjects.

Although previous studies have consistently demonstrated the benefits of Wordwall for improving motivation and learning outcomes, such as enhances students' learning engagement, motivation, and classroom participation through interactive and game-based learning activities, relatively few have focused on developing Wordwall-based learning game media specifically intended to strengthen responsibility character while simultaneously improving learning outcomes in elementary Pancasila Education. Most previous studies have emphasized cognitive achievement without integrating character education into the instructional media development process. Furthermore, only a limited number of studies have adopted the ADDIE instructional design model to develop Wordwall-based learning media for Pancasila Education (Branch, 2009; Waruwu, 2024).

Therefore, this study addresses this research gap by developing a Wordwall-based learning game media using the ADDIE instructional design model to produce instructional media that are valid, practical, and effective in improving students' responsibility character and learning outcomes. Accordingly, this study aims to (1) develop Wordwall-based learning game media for Pancasila Education, (2) examine its validity, (3) analyze its practicality, and (4) evaluate its effectiveness in improving the responsibility character and learning outcomes of sixth-grade students at UPT SPF SD Negeri Kakatua.

RESEARCH METHOD

This study employed a Research and Development (R&D) approach using the ADDIE instructional design model, which consists of five stages: analysis, design, development, implementation, and evaluation (Branch, 2009; Waruwu, 2024). The ADDIE model was selected because it provides a systematic framework for designing, developing, implementing, and evaluating instructional media while ensuring that the resulting product meets the criteria of validity, practicality, and effectiveness (Branch, 2009; Clark & Mayer, 2016).

During the analysis stage, learning needs were identified through classroom observations, interviews with the sixth-grade teacher, and curriculum analysis at UPT SPF SD Negeri Kakatua, Makassar. The analysis focused on identifying students' responsibility character, learning outcomes, classroom learning conditions, and instructional needs related to Pancasila Education. The Learning Outcomes (Capaian Pembelajaran), Learning Objectives (Tujuan Pembelajaran), and instructional indicators specified in the Merdeka Curriculum were also analyzed to ensure that the developed learning media aligned with curriculum requirements. Needs analysis is an essential stage in instructional design because it enables developers to produce learning media that correspond to learners' characteristics and instructional needs (Branch, 2009; Celik & Baturay, 2024).

During the design stage, the conceptual framework of the Wordwall-based learning game media was developed by designing the learning objectives, instructional materials, flowchart, storyboard, navigation system, user interface, student worksheets (LKPD), and assessment instruments. The learning materials were organized according to the principles of multimedia learning by combining concise explanations, visual illustrations, and interactive learning activities to facilitate meaningful learning experiences (Mayer, 2008; Mayer, 2021). Furthermore, game-based learning principles were integrated through the Wordwall platform to encourage students' motivation, participation, and responsibility during classroom learning (Deterding et al., 2011; Prensky, 2001).

During the development stage, the learning media was produced by integrating Pancasila Education materials on norms, rights, and obligations with interactive Wordwall activities, including quizzes, matching games, maze chase, true or false, and find the match. Before classroom implementation, the developed product was validated by one media expert and one subject matter expert to evaluate its instructional design, content accuracy, language, visual appearance, navigation, and usability. Expert validation is an important procedure in instructional media development because it ensures that the developed product is feasible before implementation (Milanti et al., 2023; Branch, 2009).

The implementation stage consisted of a small-group trial involving 15 sixth-grade students followed by a large-group trial involving 28 sixth-grade students at UPT SPF SD Negeri Kakatua, Makassar, Indonesia. Learning activities were conducted using the developed Wordwall-based learning game media followed by LKPD activities and classroom discussions. Interactive digital learning supported by Wordwall has been reported to improve students' engagement, motivation, and participation during classroom learning (Safitri et al., 2022; Husna & Kusumadewi, 2025; Khoiriyah et al., 2025).

Finally, the evaluation stage was conducted to determine the validity, practicality, and effectiveness of the developed learning media. Data were collected using media and material validation sheets, classroom observation sheets, teacher and student response questionnaires, responsibility character questionnaires, and pretest-posttest tests. Validation sheets were used to assess the validity of the learning media, whereas classroom observations and response questionnaires evaluated its practicality. The responsibility character questionnaire measured students' responsibility character, while the pretest and posttest measured students' learning outcomes after using the developed learning media.

The collected data were analyzed using IBM SPSS Statistics version 30 through descriptive and inferential statistical techniques. Descriptive statistics were used to analyze the validity and practicality data, whereas inferential statistics included the Shapiro-Wilk normality test, Paired Samples t-test, and N-Gain analysis to determine the effectiveness of the developed learning media. The Shapiro-Wilk test was used to examine the normality of the data, the Paired Samples t-test was employed to determine differences between pretest and posttest scores, and the N-Gain analysis was used to measure the improvement in students' learning outcomes after implementation (Waruwu, 2024; Mayer, 2021).

RESULTS AND DISCUSSION

This study developed a Wordwall-based learning game media for Pancasila Education using the ADDIE instructional design model. The development process aimed to produce learning media that met the criteria of validity, practicality, and effectiveness in improving students' responsibility character and learning outcomes (Branch, 2009; Waruwu, 2024). The media integrated interactive Wordwall activities with learning materials on norms, rights, and obligations to create meaningful learning experiences (Clark & Mayer, 2016).

The results describe the implementation of the analysis, design, development, implementation, and evaluation stages. The developed media was evaluated through expert validation, teacher and student responses, classroom implementation, responsibility character questionnaires, and learning outcomes. This systematic approach is consistent with multimedia learning principles that emphasize active learner engagement and effective instructional design (Mayer, 2021; Celik & Baturay, 2024).

Overall, the findings indicate that the developed learning media effectively supports interactive and meaningful learning. The integration of Wordwall encouraged students' motivation, participation, and engagement while improving their learning outcomes and responsibility character, consistent with previous studies on game-based and digital learning (Deterding et al., 2011; Prensky, 2001; Bureau et al., 2022; Safitri et al., 2022; Milanti et al., 2023).

Analysis stage and needs analysis

The analysis stage identified several instructional problems related to students' responsibility character and learning outcomes through classroom observations, teacher interviews, and curriculum analysis. The findings showed that students' participation remained low and many students frequently submitted assignments late, indicating the need for instructional innovation to promote active learning and responsibility. Similar findings have been reported in previous studies emphasizing that effective Pancasila Education should integrate character development with meaningful learning experiences (Usmi & Samsuri, 2022; Saputra et al., 2023).

The needs analysis also revealed that classroom instruction was still dominated by conventional teaching methods with limited integration of digital learning media. Such conditions often reduce students' engagement and learning motivation. Interactive instructional media are considered more effective in supporting active participation and improving learning quality in elementary education (Clark & Mayer, 2016). Based on these findings, the Wordwall-based learning game media was designed by integrating instructional objectives, learning materials, interactive activities, student worksheets (LKPD), and assessment instruments into a structured learning sequence. The design was intended to create meaningful learning experiences while supporting students' cognitive and character development through interactive digital learning (Mayer, 2008).

Teachers' and students' needs analysis

A needs analysis was conducted through classroom observations, teacher interviews, and curriculum analysis at UPT SPF SD Negeri Kakatua, Makassar, to identify students' characteristics, instructional problems, and curriculum requirements. This stage provides the foundation for developing learning media that are aligned with classroom needs and instructional objectives.

The findings revealed that students' responsibility character had not yet developed optimally based on preliminary classroom observations. This conclusion was drawn from several behavioural indicators, including frequent late submission of assignments, limited responsibility in completing learning tasks independently, and inconsistent participation in classroom activities. Approximately 57% of students frequently submitted assignments late, indicating weaknesses in learning responsibility. These behavioural indicators were adapted from the

responsibility character dimensions promoted in the Merdeka Curriculum, which emphasize discipline, accountability, and responsibility in completing learning tasks. In addition, 15 out of 28 students (53.57%) failed to achieve the minimum passing grade of 80, with a class average score of 68.

Teacher interviews indicated that learning was still dominated by teacher-centered instruction using printed materials, with limited use of interactive digital media. Although students were familiar with technology, it had not been effectively integrated into classroom learning. Similar studies have shown that technology-supported learning environments increase student engagement and improve learning quality. Curriculum analysis further indicated the need for instructional media that promote active participation, independent learning, and meaningful interaction. Curriculum analysis further indicated the need for instructional media that promote active participation, independent learning, and meaningful interaction. Previous studies, including those by Husna and Kusumadewi (2025), have reported that interactive digital media enhance students' motivation, engagement, and learning achievement. Therefore, a Wordwall-based learning game media was developed to strengthen students' responsibility character and improve their learning outcomes.

Material needs analysis

The material analysis was conducted by reviewing the learning outcomes, learning objectives, and instructional indicators specified in the Merdeka curriculum for sixth-grade Pancasila Education. This analysis aimed to ensure that the developed learning media was aligned with the curriculum and addressed the expected competencies of students. According to the Merdeka Curriculum, Pancasila Education should not only develop students' conceptual understanding but also foster positive character and responsible behavior through meaningful and contextual learning experiences (Usmi & Samsuri, 2022; Parhan & Sukaenah, 2020).

The curriculum analysis identified that the learning materials should enable students not only to understand the concepts of norms, rights, and obligations, but also to apply these concepts responsibly in their daily lives. Based on the analysis, the developed learning media covers four main topics: (1) the concept and types of norms in society, (2) rights and obligations in the family, school, and community, (3) the relationship between rights and obligations, and (4) the implementation of responsible behavior in everyday life. These topics were systematically organized according to the sequence of learning objectives and integrated into interactive Wordwall activities to facilitate active participation, independent learning, and meaningful learning experiences.

The material design also emphasized the development of students' responsibility character by integrating learning activities that explicitly fostered four responsibility indicators: completing learning tasks, independent learning, learning discipline, and responsibility for learning outcomes. These indicators were embedded in contextual learning activities and interactive Wordwall games that encouraged students to participate actively, complete learning tasks independently, follow classroom procedures, and reflect on their learning outcomes. Such learning experiences are consistent with the principles of meaningful learning, which encourage students to actively construct knowledge through interaction and real-life application (Mayer, 2021). Furthermore, previous studies have shown that interactive digital learning media, particularly Wordwall, can improve students' motivation, engagement, and learning outcomes by combining instructional content with game-based learning activities (Safitri et al., 2022; Husna & Kusumadewi, 2025; Khoiriyah et al., 2025). Therefore, the developed Wordwall-based learning game media was designed not only to improve students' cognitive achievement but also to strengthen their responsibility character through interactive, contextual, and engaging learning experiences.

Design stage of the Wordwall-based learning game media

The design stage aimed to develop the conceptual framework of the Wordwall-based learning game media for Pancasila Education based on the results of the needs analysis. In the ADDIE model, the design stage serves as a planning phase in which instructional objectives, learning strategies, content organization, and assessment methods are systematically prepared before product development begins (Branch, 2009; Waruwu, 2024). Therefore, this stage played an essential role in ensuring that the developed learning media addressed the instructional needs identified during the analysis stage.

At this stage, the researcher designed the overall structure of the learning media, including the learning objectives, four curriculum-based learning topics, four interactive Wordwall game activities, student worksheets, media usage instructions, the user interface, navigation system, storyboard, and flowchart. The media was systematically designed in accordance with the Merdeka Curriculum, the learning characteristics of sixth-grade elementary school students, and the objective of improving students' responsibility character and learning outcomes. The visual appearance, navigation structure, and learning sequence were developed to provide a simple, attractive, and user-friendly interface that facilitates students' independent learning and active participation. The design outputs are presented in the Storyboard Design and Flowchart Design sections, which illustrate the organization of the instructional components and the navigation flow of the developed learning media.

The instructional materials were organized sequentially to support meaningful learning by connecting conceptual understanding with real-life situations. Interactive Wordwall activities were incorporated to reinforce students' understanding through immediate feedback and active engagement. According to Mayer (2021), well-designed multimedia learning environments facilitate knowledge construction by integrating visual elements, interactive activities, and appropriate instructional guidance. Likewise, Branch (2009) emphasized that careful instructional design contributes significantly to the quality and effectiveness of learning products developed through the ADDIE model.

Furthermore, the design of the learning media emphasized not only cognitive achievement but also the development of students' responsibility character through contextual learning activities and interactive tasks. Previous studies have reported that interactive digital learning media, particularly Wordwall, can increase students' motivation, participation, and learning achievement by creating engaging and enjoyable learning experiences (Safitri et al., 2022; Husna & Kusumadewi, 2025; Khoiriyah et al., 2025). Therefore, the outputs of the design stage served as the blueprint for developing a valid, practical, and effective Wordwall-based learning game media for classroom implementation.

Designing e-module components

The Wordwall-based learning game media was designed with several integrated components to support interactive, meaningful, and student-centered learning. The main components include the cover page, learning objectives, instructions for use, motivation, apperception, learning materials, interactive Wordwall activities, student worksheets (LKPD), and navigation menus. These components were systematically organized to provide a logical learning sequence that facilitates students' independent learning, active participation, and meaningful interaction throughout the instructional process.

The learning media was developed using an attractive visual layout, intuitive navigation, and interactive learning activities appropriate for the characteristics of sixth-grade elementary school students. According to Mayer (2021), effective multimedia learning should integrate visual design, instructional content, and learner interaction to facilitate knowledge construction and improve learning outcomes. Similarly, Branch (2009) emphasized that well-structured instructional components contribute significantly to the effectiveness of instructional products.

Each component of the learning media was designed to complement one another in achieving the learning objectives. The cover page introduces the learning media, while the learning objectives provide students with clear instructional targets. The motivation and apperception sections prepare students for learning by stimulating curiosity and connecting prior knowledge with new concepts. The learning materials present the concepts of norms, rights, and obligations, which are reinforced through interactive Wordwall activities and student worksheets (LKPD). These activities encourage students to participate actively, solve problems, and complete learning tasks independently.

Furthermore, the integration of interactive Wordwall activities was intended to create an engaging learning environment while strengthening students' responsibility character and improving their learning outcomes. Previous studies have shown that Wordwall-based learning activities can increase students' motivation, classroom participation, and academic achievement because they combine instructional content with enjoyable game-based experiences (Safitri et al., 2022; Husna & Kusumadewi, 2025; Khoiriyah et al., 2025). Therefore, the designed learning media provides a structured and interactive learning experience that supports the implementation of Pancasila education in based on the objectives of the Merdeka Curriculum.

Content/material design

The content and instructional materials of the Wordwall-based learning game media were designed to support active, meaningful, and interactive learning in accordance with the learning objectives and the characteristics of sixth-grade elementary school students. The instructional content was systematically organized based on the Merdeka Curriculum, particularly the learning outcomes and learning objectives for Pancasila education, covering the topics of norms, rights, and obligations in daily life. The materials were arranged sequentially to facilitate conceptual understanding while encouraging students to apply Pancasila values in real life.

Each topic was integrated with interactive Wordwall learning activities to reinforce students' understanding, increase learning engagement, and provide immediate feedback during the learning process. The integration of game-based activities was intended to create enjoyable learning experiences while encouraging students to participate actively and complete learning tasks responsibly. Previous studies have shown that Wordwall-based learning can improve students' motivation, participation, and learning achievement because it combines instructional content with interactive digital activities (Safitri et al., 2022; Husna & Kusumadewi, 2025; Khoiriyah et al., 2025). In addition, well-organized multimedia content supports students in constructing knowledge more effectively through the integration of visual elements, instructional guidance, and learner interaction (Mayer, 2021).

English Translation:
- Game-Based Learning Media
- Pancasila Education
- Wordwall-based learning game
- Grade VI Elementary School
- Let's Learn in a Fun Way
- Click Start

Figure 1. Cover and main interface of the wordwall-based learning game media

The cover page was designed as the initial interface of the learning media to introduce the instructional content and provide access to the main navigation menus. It presents the title of the learning media together with visual elements that reflect the theme of Pancasila Education and create an attractive first impression for students. A clear and appealing interface is expected to increase students' interest before entering the learning activities. Figure 1 presents the cover and main interface of the Wordwall-based learning game media developed in this study.

The instructions for using the Wordwall-based learning game media were designed to help teachers and students understand the procedures for accessing the learning materials, navigating the learning media, completing the interactive Wordwall activities, and working on the student worksheets (See Figure 2). Clear and systematic instructions were provided to ensure that students could use the learning media independently while participating actively in each stage of the learning process.

English Translation:
- Media Usage Instructions
- Student Worksheet
- Start the Wordwall Game
- Learning Materials Link
- Home
- Back
- Next

Figure 2. Media usage instructions for the Wordwall-based learning game

The instructions also explain the sequence of learning activities, enabling students to move easily from one section to another through the available navigation menus. This design was intended to improve the usability of the learning media and facilitate meaningful learning experiences. According to Mayer (2021), clear instructional guidance and well-organized navigation reduce students' cognitive load and support more effective multimedia learning. Likewise, Branch (2009) emphasized that providing clear user guidance is an essential component of instructional media developed using the ADDIE model because it promotes efficient learning and improves users' learning experiences.

The motivation section was designed to stimulate students' interest, enthusiasm, and readiness before beginning the learning activities (See Figure 3). This section aimed to encourage positive learning attitudes, increase students' motivation, and prepare them to participate actively throughout the learning process. Motivational messages were presented at the beginning of the learning media to build students' confidence and create a positive learning atmosphere before they explored the instructional materials.

Providing motivational support at the beginning of learning is important because students who are motivated tend to demonstrate greater engagement, persistence, and responsibility during learning activities. According to Bureau et al. (2022), learning motivation is one of the key factors influencing students' participation and academic achievement. Similarly, Safitri et al. (2022) reported that interactive digital learning media combined with motivational elements can significantly increase students' enthusiasm and active involvement in classroom learning.

English Translation:
- Game-Based Learning Media
- Pancasila Education
- Wordwall-based learning
- Motivation
- Do you know?
- Every student has rights that must be fulfilled and responsibilities that must be carried out. By performing responsibilities responsibly, life will become better.
- Study with enthusiasm and become a generation with Pancasila character

Figure 3. Motivation page

The apperception section was designed to activate students' prior knowledge and connect their previous learning experiences with the new instructional materials (See Figure 4). This activity aimed to help students recognize the relevance of the learning topics to their daily lives and facilitate a smooth transition to the main learning activities. By linking existing knowledge with new concepts, students were expected to develop a deeper understanding of the learning materials and participate more actively throughout the learning process.

The inclusion of an apperception activity is consistent with the principles of meaningful learning, which emphasize that new knowledge is acquired more effectively when it is connected to learners' existing cognitive structures (Mayer, 2021). In addition, contextual learning encourages students to relate instructional content to authentic experiences, thereby improving conceptual understanding and learning engagement (Parhan & Sukaenah, 2020). Previous studies have also reported that meaningful and interactive learning activities increase students' motivation and participation in Pancasila Education (Usmi & Samsuri, 2022; Firdaus et al., 2025).

English Translation:
- Wordwall-based Learning Game for Pancasila Education
- Apperception
- Let's recall
- Answer the following questions honestly.
- 1. What rights do you have at school?
- 2. What are your responsibilities as a student at school?
- 3. What happens if rights and responsibilities are not carried out responsibly?
- Let's think actively. Your answers will help us understand the lesson better.
- Navigation buttons: Back, Next.

Figure 4. Apperception page

The learning objectives were developed based on the learning outcomes specified in the Merdeka Curriculum for Grade VI of Pancasila education (See Figure 5). They were formulated to guide students in achieving the expected competencies related to norms, rights, and obligations while simultaneously strengthening their responsibility character. The learning

objectives also served as a reference for organizing the instructional content, learning activities, and assessment to ensure that all components of the learning media were aligned with the expected curriculum outcomes.

Clearly defined learning objectives are essential because they provide students with explicit expectations regarding the knowledge, skills, and attitudes to be achieved during the learning process. According to Branch (2009), well-formulated instructional objectives are fundamental elements of instructional design because they guide the selection of learning strategies, instructional materials, and assessment methods. Furthermore, Usmi and Samsuri (2022) emphasized that Pancasila Education should not only promote students' cognitive understanding but also foster responsible behavior, civic values, and active participation in society. Therefore, the learning objectives were designed to integrate cognitive achievement with the development of responsibility character through interactive and meaningful learning experiences.

English Translation:

- Wordwall-based Learning Game for Pancasila Education
- Learning Objectives
- Students are able to identify norms, rules, rights, and responsibilities in the family, school, and community.
- Students are able to analyze the implementation of norms, rules, rights, and responsibilities as members of the family, community, and school.
- Students are able to implement rights and responsibilities responsibly in everyday life.
- Students are able to comply with agreements made within the family and school environment.
- Navigation Buttons: Back and Next.

Figure 5. Learning objectives

The learning materials were systematically organized based on the learning outcomes and learning objectives of the Merdeka Curriculum for Grade VI of Pancasila Education. The materials covered the topics of norms, rights, and obligations in daily life and were arranged in a logical sequence to help students gradually develop conceptual understanding before applying the concepts through interactive learning activities (See Figure 6).

The instructional content was presented using concise explanations, contextual examples, and supporting illustrations to facilitate students' understanding and maintain their learning interest. The use of visual elements and simplified explanations was intended to reduce cognitive load while helping students connect abstract concepts with real-life situations. According to Mayer (2021), well-designed multimedia learning materials that combine text and visuals can improve students' comprehension and knowledge retention. The instructional content was presented using concise explanations, contextual examples, and supporting illustrations to facilitate students' understanding and maintain their learning interest. The use of visual elements and simplified explanations was intended to reduce cognitive load while helping students connect abstract concepts with real-life situations. According to Mayer (2021), well-designed multimedia learning materials that combine text and visuals can improve students' comprehension and knowledge retention. Likewise, Previous studies have consistently reported that Wordwall is effective in increasing students' motivation, classroom participation, and learning achievement. Husna and Kusumadewi (2025) found that Wordwall significantly

improved students' motivation in elementary educational settings, while Khoiriyah et al. (2025) reported that interactive Wordwall activities increased students' engagement and participation during classroom instruction. Similarly, Safitri et al. (2022) and Lisandra et al. (2025) concluded that Wordwall-based digital games create enjoyable learning experiences that improve learning motivation, critical thinking, and academic achievement among elementary school students.

The learning materials were further integrated with Wordwall-based interactive activities, allowing students to reinforce their understanding through quizzes, matching activities, and other game-based exercises. Such integration encourages active participation and provides immediate feedback, enabling students to monitor their own learning progress. Previous studies have shown that Wordwall-based learning activities effectively improve students' motivation, engagement, and academic achievement in elementary education (Safitri et al., 2022; Husna & Kusumadewi, 2025; Khoiriyah et al., 2025).

English Translation:
- Wordwall-based Learning Game for Pancasila Education
- Learning Materials
- To learn more detail, please click the button below.
- Open Learning Materials
- Click the OPEN LEARNING MATERIALS button to access the learning materials through the provided link.
- Learning becomes more enjoyable with Wordwall games.
- Navigation Buttons: Back, Next, Home.

Figure 6. Learning materials

The Wordwall game activities were designed to provide students with interactive learning experiences through game-based exercises related to the topics of norms, rights, and obligations. The activities enabled students to apply their understanding by answering quizzes, matching concepts, solving interactive challenges, and completing various game-based tasks while receiving immediate feedback on their performance (See Figure 7). This interactive approach encouraged students to participate actively throughout the learning process and provided opportunities to reinforce their conceptual understanding in an enjoyable learning environment.

The integration of Wordwall into the learning media was intended to transform conventional classroom instruction into a more engaging and student-centered learning experience. Immediate feedback and interactive game elements allowed students to identify their learning progress, correct misconceptions, and improve their understanding independently. According to Mayer (2021), interactive multimedia facilitates meaningful learning by combining instructional content with active learner engagement. Likewise, Branch (2009) emphasized that instructional activities should provide learners with opportunities to practice and apply newly acquired knowledge through meaningful learning experiences.

Husna and Kusumadewi (2025) found that Wordwall significantly improved students' motivation in Pancasila Education learning, while Khoiriyah et al. (2025) reported that interactive Wordwall activities increased students' engagement and participation during

classroom instruction. Similarly, Safitri et al. (2022) and Lisandra et al. (2025) concluded that Wordwall-based digital games create enjoyable learning experiences that improve learning motivation, critical thinking, and academic achievement among elementary school students.

English Translation:

- Wordwall-based Learning Game for Pancasila Education
- Wordwall Game Instructions
- The game consists of several Wordwall activities.
- Quiz
- Make a Match
- Spin the Wheel
- Open the Box
- Start the Game
- Click the "Start the Game" button to access the Wordwall game through the provided link.
- Navigation Buttons: Back, Next.

Figure 7. Learning games

The student worksheet was designed to reinforce students' understanding of the learning materials after completing the interactive Wordwall activities (See Figure 8). The worksheet contained structured learning tasks that required students to apply their knowledge of norms, rights, and obligations in various real-life situations. These activities encouraged students to analyze problems, make appropriate decisions, and relate the concepts learned to their daily experiences.

The worksheet was also designed to promote students' responsibility character by encouraging them to complete learning tasks independently, systematically, and on time. Through these structured activities, students were expected to develop not only conceptual understanding but also positive learning habits, including discipline, responsibility, and independent learning. According to Branch (2009), well-designed learning tasks are an essential component of instructional design because they enable students to practice and apply newly acquired knowledge in meaningful contexts. Similarly, Parhan and Sukaenah (2020) emphasized that contextual learning activities help students internalize Pancasila values by connecting instructional content with authentic experiences.

Furthermore, integrating the LKPD with interactive Wordwall activities created a balanced learning process that combined digital interaction with written reflection and problem-solving. Previous studies have shown that combining interactive learning media with structured learning tasks can improve students' engagement, learning motivation, and academic achievement (Safitri et al., 2022; Husna & Kusumadewi, 2025; Firdaus et al., 2025). Therefore, the LKPD served as an important component of the developed learning media in supporting both students' learning outcomes and the development of their responsibility character.

English translation:
- Wordwall-based Learning Game for Pancasila Education
- Learning reflection
- Greeting
- Congratulations!
- Instruction
- Buttons
- Open the Student Worksheet
- Message
- Motivational Message
- Navigation Buttons: Back-Next

Figure 8. Students worksheet

Flowchart design

The flowchart was designed to illustrate the sequence of learning activities and the navigation structure of the Wordwall-based learning game media. It describes the systematic learning process, beginning with the cover page, followed by the instructions for use, motivation, apperception, learning objectives, learning materials, Wordwall game activities, student worksheet, and reflection. The flowchart served as a blueprint for organizing the instructional process and ensuring that students completed each learning activity in a logical and structured sequence.

The use of a flowchart is essential during the design stage because it provides a clear representation of the relationship among the learning components and facilitates the systematic development of instructional media. According to Branch (2009), a well-designed instructional flow helps ensure that learning activities are organized coherently and aligned with the intended learning objectives. Likewise, Waruwu (2024) explained that systematic planning is a fundamental characteristic of the research and development process because it contributes to the development of valid, practical, and effective instructional products.

The sequential organization of the learning activities also supports meaningful learning by guiding students through each stage of the instructional process, from initial orientation to reflection. Such a structured learning sequence enables students to construct knowledge gradually while actively participating in interactive learning activities (Mayer, 2021).

English Translation:
- Media Cover
- Media Usage Instructions
- Motivation
- Apperception
- Learning Objectives
- Learning Materials
- Wordwall Game
- Learning Reflection

Figure 9. Flowchart of the Wordwall learning game

Storyboard design

The storyboard was developed based on the previously designed flowchart to provide a detailed visualization of the sequence, layout, and interactive features of each page in the Wordwall-based learning game media. During the design stage, the storyboard served as a planning tool that guided the organization of instructional content, navigation, visual elements, and interactive learning activities before the actual media development process. This approach ensured that all learning components were systematically arranged and aligned with the intended learning objectives.

The storyboard consisted of the cover page, instructions for use, motivation, apperception, learning objectives, learning materials, Wordwall game activities, student worksheet (LKPD), and reflection. Each page was carefully designed to maintain consistency in layout, typography, color composition, navigation, and instructional flow. Such consistency helps students navigate the learning media more easily and supports a coherent learning experience.

According to Branch (2009), storyboards are an important component of instructional design because they provide a detailed blueprint that facilitates communication between the planning and development stages while ensuring that all instructional elements are systematically organized. In addition, Mayer (2021) emphasized that a well-structured multimedia design, supported by consistent visual organization and intuitive navigation, enhances students' understanding and reduces unnecessary cognitive load during learning. Likewise, Waruwu (2024) explained that careful planning through systematic design documentation contributes to the development of instructional products that are valid, practical, and effective.

The completed storyboard served as the primary reference throughout the media development stage, ensuring that the final product remained consistent with the learning objectives, curriculum requirements, and characteristics of sixth-grade elementary school students. Table 1 presents the storyboard of the Wordwall-based learning game media developed in this study.

The storyboard functioned as the primary reference during the development stage by illustrating the arrangement of visual elements, instructional content, navigation buttons, and interactive activities. This design ensured that the learning media was systematically organized, user-friendly, and aligned with the intended learning objectives as well as the learning characteristics of sixth-grade elementary school students. According to Branch (2009), a storyboard serves as a detailed blueprint that facilitates the development of instructional media by ensuring consistency between the instructional design and the final product. Similarly, Mayer (2021) emphasized that well-structured multimedia design, supported by clear navigation and logical content organization, enhances students' learning experiences and promotes more effective knowledge acquisition.

Developing stage

The development stage involved producing the Wordwall-based learning game media, conducting expert validation, revising the product based on the validators' suggestions, and preparing the media for classroom implementation. The developed media was evaluated by media experts and subject matter experts to assess its content quality, instructional design, visual appearance, language, and usability. This process was conducted to ensure that the learning media met the criteria of validity and was appropriate for use in Pancasila Education learning.

Table 1. Storyboard of the developed Wordwall-based learning game media

No.	*Storyboard Screen*	Storyboard Description
1		Displays the cover page of the developed Wordwall-based learning game media, including the media title, grade level, student illustrations, the Start button, and the Pancasila Student Profile icon as an introduction before students begin the learning activities.
2		Displays the media usage instructions, explaining the functions of each navigation button, namely Student Worksheet (LKPD), Learning Materials Link, Start the Game, Home, Back, and Next, enabling students to use the learning media independently and systematically.
3		Displays a motivational message related to citizens' rights and responsibilities to foster students' motivation, readiness, and interest before participating in the learning activities.
4		Displays apperception questions that connect students' prior knowledge with the topics of norms, rights, and responsibilities, preparing them for the learning process.
5		Displays the learning objectives that students are expected to achieve after completing the lesson, in accordance with the Learning Outcomes (CP) and Learning Objectives (TP) of the Merdeka Curriculum for Phase C Pancasila Education.
6		Displays the Open Learning Materials button linked to the instructional content, allowing students to study the learning materials independently before participating in the Wordwall game activities.
7		Displays the game instructions and the Start the Game button linked to the Wordwall platform, enabling students to access the interactive game as part of the learning activities.
8		Displays the Open Student Worksheet (LKPD) Reflection button linked to the Student Worksheet (LKPD), allowing students to complete reflection activities to evaluate their understanding after the learning process.

Expert validation results

Based on the media validity criteria presented in Table 2, the validity of the Wordwall-based learning game media was evaluated by media experts and subject matter experts to determine its feasibility before classroom implementation. The validation process assessed several aspects, including instructional design, content accuracy, language, visual appearance, navigation, and usability. The media expert awarded a validity score of 84%, which was categorized as highly valid, while the subject matter expert awarded a score of 87%, which was also categorized as highly valid. These results indicate that the developed learning media is feasible for classroom implementation without requiring major revisions. Suggestions provided by the validators were used to improve the media, particularly in terms of visual presentation and content refinement. After the revisions were completed, the media was considered suitable for the implementation stage.

Table 2. Media validity criteria [a]

Percentage Interval	Validity Category	Interpretation
81% < Score ≤ 100%	Highly Valid	No revision required
61% < Score ≤ 80%	Valid	Minor revision required
41% < Score ≤ 60%	Fairly Valid	Partial revision required
21% < Score ≤ 40%	Less Valid	Major revision required
0% < Score ≤ 20%	Invalid	Total revision required

[a] Source: Adapted from Kholifah and Ekayati (2023)

instruments, media design, and instructional materials to enhance the quality and usability of the developed product. The student response questionnaire was revised by adding assessment indicators and improving the wording of several statements. In addition, the media cover was redesigned to provide a simpler and more attractive appearance, while the learning materials were simplified and the font size was increased to improve readability. A summary of the revisions is presented in Table 3.

Table 3. Summary of revisions based on expert validation

No.	Revised Aspect	Validators' Suggestions	Revisions Made
1	Student Response Questionnaire	Add assessment indicators and improve the wording of questionnaire items to measure students' responses more comprehensively.	Assessment indicators were added, and the questionnaire items were revised to improve clarity and comprehensiveness.
2	Media Cover Design	Improve the cover design to make it simpler and more attractive.	The cover design was revised with a simpler layout and a more attractive visual appearance.
3	Learning Material Presentation	Simplify the learning materials and increase the font size to improve readability.	The learning materials were simplified, and the font size was enlarged to enhance readability.

Implementation stage

The implementation stage was conducted to evaluate the practicality and effectiveness of the Wordwall-based learning game media in Pancasila Education learning. At this stage, the validated media was implemented through small-group and large-group trials involving sixth-grade elementary school students. The implementation process aimed to examine the usability of the learning media, while its practicality was evaluated through observations of learning implementation and questionnaires administered to teachers and students. The effectiveness of the media was further assessed through students' responsibility character and learning outcomes after using the developed learning media.

Small group testing results

The small-group trial was conducted to evaluate the practicality of the Wordwall-based learning game media before its implementation in the large-group trial. The trial involved 15 sixth-grade students at UPT SPF SD Negeri Kakatua. During the implementation, the classroom teacher observed the learning process, while the practicality of the media was evaluated through learning implementation observation sheets and teacher and student response questionnaires.

Learning implementation observation

The implementation of learning using the Wordwall-based learning game media was observed by the classroom teacher using a Guttman scale with two response options (Yes and No) to determine whether each learning activity was implemented as planned. The observation results were analyzed descriptively to determine the level of learning implementation for each observation aspect. The results are presented in Table 4.

Table 4. Results of learning implementation observation in the small-group trial

No.	Observation Aspect	Score (%)	Category
1	Opening the lesson	100	Very Good
2	Positive habituation	100	Very Good
3	Communicating the learning objectives	100	Very Good
4	Providing guiding questions	100	Very Good
5	Student participation	100	Very Good
6	Use of the learning media	100	Very Good
7	Motivation and ice breaking	100	Very Good
8	Presentation of learning materials	100	Very Good
9	Implementation of the Wordwall game	100	Very Good
10	Student engagement in the game	100	Very Good
11	Discussion and completion of the student worksheet (LKPD)	100	Very Good
12	Students' responsibility	100	Very Good
13	Appreciation and motivation	100	Very Good
14	Reflection activity	100	Very Good
15	Closing activity	100	Very Good
Average		100	Very Good

Based on the results presented in Table 4, all fifteen observation aspects achieved a score of 100%, indicating that every stage of the learning process was implemented as planned. The overall learning implementation was therefore categorized as **Very Good**, demonstrating that the Wordwall-based learning game media was implemented effectively and consistently during the small-group trial.

Student response questionnaire results

The practicality of the learning media was further evaluated through a student response questionnaire administered after the learning activities. The questionnaire assessed three aspects of the developed Wordwall-based learning game media**:** ease of use, attractiveness of the media, and appropriateness for classroom learning**.** Responses were collected using a four-point Likert scale consisting of strongly practical, practical, less practical, and impractical. The results are presented in Table 5**.**

Table 5. Student response questionnaire results

No.	Questionnaire Indicator	Percentage (%)	Category
1	Ease of use	95	Highly Practical
2	Attractiveness of the media	95	Highly Practical
3	Appropriateness for classroom learning	98	Highly Practical
Average		96	Highly Practical

As shown in Table 5, the average student response score reached 96%, indicating that the developed learning media was highly practical**.** Among the three assessed aspects, appropriateness for classroom learning obtained the highest score (98**%**), while ease of use and attractiveness of the media each obtained 95**%**. These findings indicate that students perceived the Wordwall-based learning game media as easy to use, attractive, and appropriate for supporting classroom learning.

Large group testing results

The large-group trial was conducted to evaluate the practicality and effectiveness of the Wordwall-based learning game media after the small-group trial. The trial involved 28 sixth-grade students at UPT SPF SD Negeri Kakatua. During the implementation, the classroom teacher observed the learning process, while the practicality of the developed learning media was evaluated through learning implementation observation sheets and teacher and student response questionnaires.

Learning implementation observation

The implementation of learning using the Wordwall-based learning game media was observed by the classroom teacher during the large-group trial. The observation was conducted using a Guttman scale with two response options (Yes and No) to determine whether each stage of the learning process was implemented according to the planned procedures. The observation data were analyzed descriptively to determine the level of learning implementation for each observation aspect. The results are presented in Table 6**.**

Table 6. Results of learning implementation observation in the large-group trial

No.	Observation Aspect	Score (%)	Category
1	Opening the lesson	100	Very Good
2	Positive habituation	100	Very Good
3	Communicating the learning objectives	100	Very Good
4	Providing guiding questions	100	Very Good
5	Student participation	100	Very Good
6	Use of the learning media	100	Very Good
7	Motivation and ice breaking	100	Very Good
8	Presentation of learning materials	100	Very Good
9	Implementation of the Wordwall game	100	Very Good
10	Student engagement in the game	100	Very Good
11	Discussion and completion of the student worksheet (LKPD)	100	Very Good
12	Students' responsibility during learning	100	Very Good
13	Appreciation and motivation	100	Very Good
14	Reflection activity	100	Very Good
15	Closing activity	100	Very Good
Average		100	Very Good

Based on the results presented in Table 6, all fifteen observation aspects achieved a score of 100%, indicating that every stage of the learning process was implemented as planned. Therefore, the overall learning implementation was categorized as Very Good, demonstrating that the Wordwall-based learning game media was implemented effectively and consistently during the large-group trial.

Student response questionnaire results

A student response questionnaire was administered to evaluate the practicality of the Wordwall-based learning game media during the large-group trial. The questionnaire was completed by 28 sixth-grade students of UPT SPF SD Negeri Kakatua after participating in the learning activities. It assessed three aspects of the developed learning media, namely ease of

use, attractiveness of the media, and appropriateness for classroom learning, using a four-point Likert scale consisting of strongly practical, practical, less practical, and impractical. The results are presented in Table 7.

Tabel 7. Student response questionnaire results in the large-group trial

No.	Questionnaire Indicator	Percentage (%)	Category
1	Ease of use	98	Highly Practical
2	Attractiveness of the media	98	Highly Practical
3	Appropriateness for classroom learning	98	Highly Practical
Average		98	Highly Practical

As shown in Table 7, the average student response score reached 98%, indicating that the developed Wordwall-based learning game media was highly practical. All three questionnaire indicators obtained scores within the highly practical category, indicating that students perceived the media as easy to use, attractive, and appropriate for supporting classroom learning. These findings demonstrate that the developed media effectively facilitated students' participation and provided a positive learning experience during the large-group trial.

Teacher response questionnaire results

The teacher response questionnaire was administered to evaluate the practicality of the Wordwall-based learning game media during the large-group trial. The questionnaire was completed by the sixth-grade homeroom teacher of UPT SPF SD Negeri Kakatua after the implementation of the learning activities. It assessed the practicality of the developed learning media in terms of ease of use, accessibility, content suitability, visual appearance, and usefulness in supporting the learning process. The results are presented in Table 8.

Tabel 8. Teacher response questionnaire results

No.	Questionnaire Indicator	Percentage (%)	Category
1	Ease of use	100	Highly Practical
2	Accessibility	100	Highly Practical
3	Content suitability	100	Highly Practical
4	Visual appearance	100	Highly Practical
5	Usefulness in supporting the learning process	100	Highly Practical
Average		100	Highly Practical

As shown in Table 8, all questionnaire indicators achieved a score of 100%, indicating that the developed Wordwall-based learning game media was highly practical. The teacher perceived the media as easy to use, accessible, appropriate to the learning content, visually attractive, and effective in supporting the teaching and learning process. These findings demonstrate that the developed media is highly feasible for classroom implementation.

The practicality of the Wordwall-based learning game media was demonstrated through the results of the learning implementation observations and the response questionnaires completed by teachers and students. In the small-group trial, the learning implementation achieved 100%, while the student response questionnaire reached 96%, both categorized as highly practical. Similarly, in the large-group trial, the learning implementation achieved 100%, the student response questionnaire reached 98%, and the teacher response questionnaire reached 100%, indicating consistently high practicality across different implementation stages. These findings suggest that the developed learning media is easy to use, supports classroom instruction effectively, and provides an engaging learning experience for students.

The high level of practicality can be attributed to the systematic organization of the learning materials, clear navigation, attractive visual design, and the integration of interactive Wordwall activities that actively involve students throughout the learning process. Interactive learning

media have been shown to increase students' engagement, motivation, and participation while assisting teachers in delivering learning materials more effectively. Furthermore, Wordwall facilitates immediate feedback and interactive assessment, making the learning process more meaningful and enjoyable for elementary school students (Husna & Kusumadewi, 2025; Firdaus et al., 2025).

Evaluation stage on the effectiveness of the Wordwall-based learning game media

The effectiveness of the Wordwall-based learning game media was evaluated through small-group and large-group trials involving sixth-grade students at UPT SPF SD Negeri Kakatua. The evaluation aimed to determine the effectiveness of the developed media in improving students' responsibility character and learning outcomes in Pancasila Education. The effectiveness data were collected using a responsibility character questionnaire, student response questionnaire, pretest and posttest, normality test, N-Gain analysis, and *Paired Samples t*-test.

Effectiveness evaluation in the small-group trial

The effectiveness of the Wordwall-based learning game media was evaluated through a small-group trial involving 15 sixth-grade students at UPT SPF SD Negeri Kakatua. The evaluation aimed to determine the effectiveness of the developed learning media in supporting students' responsibility character and improving learning outcomes in Pancasila Education. The effectiveness data were collected using a responsibility character questionnaire, a student response questionnaire, and pretest and posttest results.

A responsibility character questionnaire was administered to explore students' perceptions of their responsibility character after participating in the learning activities using the developed Wordwall-based learning game media. The questionnaire was completed by 15 sixth-grade students of UPT SPF SD Negeri Kakatua and assessed four indicators: completing assigned tasks, independent learning, learning discipline, and responsibility for learning outcomes. The results are presented in Table 9.

Table 9. Responsibility character questionnaire results in the small-group trial

No.	Responsibility Character Indicators	Percentage (%)
1	Completing assigned tasks	95%
2	Independent learning	95%
3	Learning discipline	96%
4	Responsibility for learning outcomes	94%
Average		95%

Based on the results presented in Table 9, the average responsibility character questionnaire score reached 95%, which falls within the very high category. Among the four indicators, learning discipline obtained the highest percentage (96%), while responsibility for learning outcomes obtained 94%. These findings indicate that students perceived themselves as demonstrating a high level of responsibility after participating in the learning activities, particularly in completing assigned tasks, learning independently, maintaining learning discipline, and taking responsibility for their learning outcomes. Since these findings were obtained through a self-report questionnaire, they reflect students' perceptions of their responsibility character rather than direct behavioral observations.

Student Response to the Learning Media. A student response questionnaire was administered to evaluate students' perceptions of the Wordwall-based learning game media after participating in the learning activities. The questionnaire was completed by 15 sixth-grade students of UPT SPF SD Negeri Kakatua and assessed three aspects: ease of use, attractiveness of the media, and appropriateness for classroom learning. The results of the student response questionnaire are presented in Table 10.

Table 10. Student response to the learning media in the small-group trial

No.	Indicators	Percentage (%)
1	Ease of use	95%
2	Attractiveness of the media	95%
3	Appropriateness for classroom learning	98%
Average		96%

Based on the results presented in Table 10, the average student response score reached 96%, which falls within the highly practical category. Among the three assessed aspects, appropriateness for classroom learning obtained the highest percentage (98%), while ease of use and attractiveness of the media each obtained 95%. These findings indicate that students perceived the developed Wordwall-based learning game media as easy to use, visually attractive, and appropriate for supporting classroom learning.

Pretest-posttest results. The pretest and posttest were administered to evaluate the improvement in students' learning outcomes after using the Wordwall-based learning game media during the small-group trial. The results showed a clear improvement in students' learning achievement following the learning intervention. Before using the learning media**,** 1 student (6.7%) was in the very high category**,** 6 students (40.0%) were in the high category, 5 students (33.3%) were in the moderate category, and 3 students (20.0%) were in the low category. After the implementation of the Wordwall-based learning game media, the posttest results improved substantially, with 11 students (73.3%) achieving the very high category and 4 students (26.7%) achieving the high category. The detailed results are presented in Table 11.

Table 11. Pretest and posttest results in the small-group trial

Score Range	Category	Pretest *n*	Pretest (%)	Posttest *n*	Posttest (%)
81%-100%	Very High	1	6.7	11	73.3
61%-80%	High	6	40	4	26.7
41%-60%	Moderate	5	33.3	-	-
21%-40%	Low	3	20	-	-
0%-20%	Very Low	-	-	-	-
Total		15	100	15	100

Based on the results presented in Table 11, students' posttest scores showed a substantial improvement compared with their pretest scores. Before using the Wordwall-based learning game media, most students were in the high (40.0%) and moderate (33.3%) achievement categories. After the implementation of the learning media, 73.3% of the students achieved the very high category, while the remaining 26.7% achieved the high category. No students remained in the moderate, low, or very low categories. These findings indicate that the developed Wordwall-based learning game media effectively improved students' learning outcomes in Pancasila Education.

Effectiveness evaluation in the large-group trial

The effectiveness of the Wordwall-based learning game media was evaluated through a large-group trial involving 28 sixth-grade students at UPT SPF SD Negeri Kakatua. The evaluation aimed to determine the effectiveness of the developed learning media in supporting students' responsibility character and improving learning outcomes in Pancasila Education. The effectiveness data were collected using a responsibility character questionnaire, a student response questionnaire, pretest and posttest, a normality test, an N-Gain analysis, and a paired-samples *t*-test.

Responsibility character questionnaire results

A responsibility character questionnaire was administered to explore students' perceptions of their responsibility character after participating in the learning activities using the developed Wordwall-based learning game media. The questionnaire was completed by 28 sixth-grade students of UPT SPF SD Negeri Kakatua and assessed four indicators: completing assigned tasks, independent learning, learning discipline, and responsibility for learning outcomes. The results are presented in Table 12**.**

Table 12. Responsibility Character Questionnaire Results in the Large-Group Trial

No.	Responsibility Character Indicators	Percentage (%)
1	Completing assigned tasks	95.1%
2	Independent learning	93.8%
3	Learning discipline	96.2%
4	Responsibility for learning outcomes	94.9%
Average		95%

Based on the results presented in Table 12, the average responsibility character questionnaire score reached 95.0%, which falls within the very high category. The highest percentage was obtained for the learning discipline indicator (96.2%), while independent learning obtained the lowest percentage (93.8%). These findings indicate that students perceived themselves as demonstrating a high level of responsibility after participating in the learning activities, particularly in completing assigned tasks, learning independently, maintaining learning discipline, and taking responsibility for their learning outcomes. Since these findings were obtained through a self-report questionnaire, they reflect students' perceptions of their responsibility character rather than direct behavioral observations.

A normality test using the Shapiro-Wilk method in IBM SPSS Statistics indicated that both the A normality test using the Shapiro-Wilk method in IBM SPSS Statistics indicated that both the pretest (0.205) and posttest (0.228) data were normally distributed, as the significance values were greater than 0.05. Therefore, the data met the assumptions required for parametric statistical analysis.

A paired-samples *t*-test was then conducted to determine whether there was a significant difference between students' learning outcomes before and after using the Wordwall-based learning game media. The analysis revealed a significance value of Sig. (2-tailed) < 0.001, indicating a statistically significant difference between the pretest and posttest scores. The mean difference of -27.68 further demonstrates that students achieved substantially higher scores after the implementation of the developed learning media.

To determine the magnitude of learning improvement, an N-Gain analysis was performed. The results showed an average N-Gain score of 0.7400, which is classified as high, while the average N-Gain percentage was 74.00%, indicating that the developed learning media was effective in improving students' learning outcomes. In addition, the responsibility character questionnaire indicated positive student perceptions regarding their responsibility character after participating in the learning activities. Since these findings were obtained through a self-report questionnaire, they reflect students' perceived responsibility rather than direct behavioral observations.

Discussion

The findings of this study demonstrate that the Wordwall-based learning game media developed for Pancasila Education fulfilled the criteria of validity, practicality, and effectiveness. The media expert awarded a validity score of 84%, while the subject matter expert awarded 87%, indicating that the developed product was highly valid and appropriate for classroom implementation. These findings suggest that the learning media successfully met the essential requirements of

instructional design, content accuracy, language, visual presentation, navigation, and usability. The validation process also provided constructive recommendations that were incorporated into the final product, thereby improving its overall quality before implementation. These findings are consistent with the ADDIE instructional design model, which emphasizes continuous revision and expert evaluation to produce high-quality instructional media (Branch, 2009; Waruwu, 2024; Abuhassna et al., 2024).Similar findings were reported by Milanti et al. (2023), who concluded that systematic validation contributes significantly to the quality and feasibility of digital learning media.

The practicality of the developed learning media was demonstrated through both the small-group and large-group trials. Learning implementation reached 100% in both trials, while student response questionnaires achieved 96% and 98%, respectively, and the teacher response questionnaire reached 100%. These findings indicate that the developed learning media was easy to use, visually attractive, and effective in supporting classroom instruction. The integration of Wordwall activities encouraged students to participate actively through interactive exercises, immediate feedback, and enjoyable learning experiences. These findings are consistent with those of Indriani et al. (2024), who reported that Wordwall-based learning media enhance students' engagement, learning motivation, and classroom participation through interactive digital activities. Likewise, Husna and Kusumadewi (2025) found that Wordwall significantly increased students' motivation in Pancasila Education learning. Khoiriyah et al. (2025) demonstrated that Wordwall-based interactive learning improved students' classroom participation, while Firdaus et al. (2025) reported that interactive digital learning media facilitated meaningful learning and improved students' engagement.

The effectiveness of the learning media was reflected in the improvement of students' learning outcomes and in students' positive perceptions of their responsibility character. The responsibility character questionnaire produced an average score of 95% in both implementation stages, indicating that students perceived themselves as demonstrating a very high level of responsibility after using the developed learning media. The highest score was consistently obtained for the learning discipline indicator, suggesting that students perceived improvements in completing assignments, learning independently, following classroom rules, and taking responsibility for their learning outcomes. These findings support previous studies emphasizing that meaningful and contextual learning contributes to character development by encouraging students to participate actively in authentic learning experiences (Parhan & Sukaenah, 2020; Usmi & Samsuri, 2022). Furthermore, Siregar et al. (2024) explained that character-oriented learning activities effectively strengthen students' responsibility and moral values in elementary education.

Students' learning outcomes also improved substantially after the implementation of the Wordwall-based learning game media. The pretest and posttest results showed a considerable increase in the proportion of students achieving the very high achievement category. Statistical analysis further confirmed these findings. The Shapiro-Wilk normality test indicated that both the pretest and posttest data were normally distributed ($p > 0.05$), allowing further parametric analysis. The Paired Samples *t*-test revealed a statistically significant difference between students' pretest and posttest scores (Sig. (2-tailed) < 0.001). Moreover, the average N-Gain score of 0.7400 was categorized as high, indicating that the developed learning media effectively improved students' learning outcomes. These findings are consistent with those reported by Safitri et al. (2022), who found that Wordwall-based digital games significantly improve students' academic achievement through interactive learning experiences. Similar conclusions were also presented by Lisandra et al. (2025), who reported that Wordwall enhances learning motivation, critical thinking, and learning achievement in Civic Education.

The positive findings of this study can be explained through multimedia learning theory, which states that students learn more effectively when instructional materials integrate visual

elements, interactive activities, and immediate feedback in a well-organized learning environment (Mayer, 2021; Mayer, 2024**).**The developed learning media also reflects the principles of student-centered learning promoted in the Merdeka Curriculum by providing opportunities for students to explore concepts independently while actively participating in game-based learning activities. Interactive digital media enable students to construct knowledge through direct experience rather than passive information reception, resulting in greater engagement and better learning retention (Celik & Baturay, 2024).

Although the responsibility character questionnaire showed very high scores, these findings should be interpreted with caution because the evaluation was based on students' self-reported perceptions rather than direct behavioral observations. Self-report questionnaires may be influenced by social desirability and subjective judgment. Therefore, the findings primarily reflect students' perceived responsibility after using the developed learning media. Future studies are recommended to complement questionnaire data with classroom observations or other behavioral assessment methods to provide more comprehensive evidence regarding the effectiveness of the learning media in strengthening students' responsibility character.

Although the responsibility character questionnaire showed very high scores, these findings should be interpreted with caution because the evaluation was based on students' self-reported perceptions rather than direct behavioral observations. Self-report questionnaires may be influenced by social desirability and subjective judgment, which may introduce common method bias in behavioral research (Podsakoff et al., 2003). Therefore, the findings primarily reflect students' perceived responsibility after using the developed learning media rather than directly observed behavior. Future studies are recommended to complement questionnaire data with classroom observations or other behavioral assessment methods to provide more comprehensive evidence regarding the effectiveness of the learning media in strengthening students' responsibility character.

Overall, the findings indicate that the Wordwall-based learning game media is valid, highly practical, and effective for Pancasila Education learning among sixth-grade elementary school students. The integration of interactive learning activities, structured instructional content, and meaningful classroom experiences successfully improved students' learning outcomes while supporting positive student perceptions of responsibility character. Therefore, the developed learning media can serve as an innovative instructional alternative for implementing Pancasila Education in elementary schools while supporting the objectives of the Merdeka Curriculum and promoting meaningful, student-centered learning.

CONCLUSION

The Wordwall-based learning game media developed in this study successfully met the criteria of validity, practicality, and effectiveness for sixth-grade Pancasila Education learning. The systematic application of the ADDIE model contributed to creating a well-structured instructional product that is highly suitable for classroom implementation. Results from the validation, practicality, and effectiveness tests indicate that the media supports meaningful learning, improves student learning outcomes, and promotes positive perceptions of responsibility character. Furthermore, the integration of Wordwall creates interactive learning experiences that successfully increase student motivation, participation, and engagement. Because these findings align closely with multimedia learning and gamification theories, the developed media is highly recommended as an effective instructional tool to improve learning outcomes and support character development in elementary Pancasila Education.

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DECLARATION

Author contribution

All authors contribute in the research and/or writing the paper, and approved the final manuscript.

St. Rosmi R	Conceptualizing the research idea, leading the investigation, setting up the methodology, analyzing data, and writing the first draft.
Suardi	Conceptualizing the research idea, reviewing the validity of the methodology, supervising the data collection, assisting the investigation, enriching the data analysis.
Muhajir	Conceptualizing the research idea, reviewing the validity of the methodology, supervising the data collection, assisting the investigation, enriching the data analysis.

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Conflict of interest

All authors declare that they have no competing interests.

Ethics declaration

We as authors acknowledge that this work has been written based on ethical research that conforms with the regulations of our institutions and that we have obtained the permission from the relevant institutes when collecting data. We support the International Journal on Education Insight (IJEI) in maintaining the high standards of personal conduct, practicing honesty in all our professional practices and endeavors.

The use of artificial intelligence

We do not use any generative AI tools to write any part of this paper.

Additional information

Not available.

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