

Gamified digital media: Innovative media for strengthening first grade elementary students' writing literacy

Cerianing Putri Pratiwi ^{a, 1, *}, Heny Kusuma Widyaningrum ^{a, 2}, Nico Irawan ^{b, 3}

^a Universitas PGRI Madiun, Madiun, Indonesia

^b Universitas Internasional Stamford, Thailand

¹ cerianing@unipma.ac.id; ² heny@unipma.ac.id; ³ nico.irawan@stamford.edu

* Correspondent author

Received: February 20, 2026

Revised: July 10, 2026

Accepted: July 21, 2026

KEYWORDS	ABSTRACT
Digital Media Elementary School Gamification Innovative Media Writing Literacy	This study aimed to develop gamification-based digital media as an innovative learning tool to strengthen the writing literacy of first-grade elementary school students. The research used a Research and Development (R&D) method with the ADDIE model. Data were collected through expert validation questionnaires, teacher and student evaluation questionnaires, and writing skills tests. The results showed that the developed media had a high feasibility level, with material expert validation scores of 81.7 (very feasible) and media expert scores of 80.2 (feasible). User evaluations also showed very positive responses, with average scores of 82.0 from teachers and 82.75 from students. The effectiveness test results indicated that students who learned using gamification-based digital media had an average writing literacy ability of 85.71, higher than the conventional learning group at 77.50, with a statistically significant difference ($t = 3.867$; $p < 0.001$). This finding shows that integrating gamification elements can boost student engagement while also supporting the development of early writing skills through a more interactive, gradual, and motivating learning experience. This study offers theoretical contributions to the development of gamification-based literacy learning, pedagogical contributions as an alternative, more innovative writing teaching strategy, and practical contributions by providing effective digital media to support the enhancement of elementary students' writing literacy.

© 2026 The Author(s). Published by Universitas Ahmad Dahlan.

This is an open-access article under the [CC-BY-SA](#) license.



Introduction

Literacy is one of the fundamental skills that form the foundation for students' success in lifelong learning, especially at the elementary school level (Saputra et al., 2024; Yarmi, 2025). Among the various dimensions of literacy, writing literacy holds a very important position because it not only serves as a way to express ideas in written language but also as a medium to develop thinking skills, construct knowledge, and communicate learning experiences systematically (Kim et al., 2021; Martin & Dockrell, 2024). The ability to write is an important indicator of students' literacy development because through writing activities, students learn to connect concrete experiences with symbolic representations, organize information, and build meaning independently (Cattoni et al., 2024; Tyson, 2024). Therefore, mastering writing literacy from the early grades of elementary school serves as a foundation for success in learning at the next educational level (Arrimada et al., 2022; Debaryshe, 2023).

For first-grade elementary school students, writing skills are still at an early developmental stage, so they need learning that matches the characteristics of their cognitive, language, and motor development

(Kabel et al., 2022; Sari et al., 2024). Writing lessons at this stage aren't just about forming letters or copying words; they're also about connecting simple ideas into meaningful text (Mathew et al., 2025), writing literacy learning needs to be designed step by step, in a contextual way, and provide learning experiences that let students build writing skills through fun activities that make sense in a child's world (Shafiee & Alipour, 2024; Su et al., 2022; Utami & Purwanta, 2025).

Even though writing literacy plays a very important role, various studies show that beginning writing skills of elementary school students still pose a challenge in learning Indonesian (Arianti et al., 2021; Razanah & Solihati, 2022; Suryadi et al., 2022). Hanifa et al. (2025) state that most early-grade students have trouble developing basic writing skills. These difficulties include improper letter formation, arranging simple words and sentences, as well as the ability to organize ideas into meaningful writing (Majorano et al., 2021). These findings are supported by Venturaa et al. (2020), who stated that most students still see writing as a mechanical activity, like copying or following the teacher's examples, rather than as a thinking process that allows them to develop and communicate ideas. In fact, Fahira & Iswara (2023) found that around 59–60% of elementary school students have difficulties with various early writing skills, from copying letters to forming simple sentences. This condition shows that low writing literacy is still a problem that needs more innovative learning solutions (Truxius et al., 2025).

The low writing literacy skills are influenced not only by the students' developmental characteristics but also by learning processes that haven't fully supported writing skill development (Kadek et al., 2024; Nurazizah & Darmayanti, 2024; Sapkota & Gnawali, 2025). First-grade elementary students are at the concrete operational stage, so they need learning experiences that are visual, contextual, interactive, and provide opportunities to learn through fun activities (Syukri et al., 2025). However, writing lessons in elementary schools are still dominated by textbooks and worksheets focused on mechanical exercises, which aren't very effective in actively engaging students in the learning process (Pratiwi et al., 2024). This situation causes students to lose attention quickly, feel less motivated to write, and miss out on learning experiences that allow them to gradually develop their writing skills (Ingriyani & Pebrianti, 2021).

The development of digital technology offers huge opportunities to provide learning that better suits the characteristics of today's generation (Pratiwi & Alfiati, 2023). Various studies show that digital media can improve the quality of learning by presenting material in a more engaging, interactive, and adaptive way for students' needs (Maula & Antara, 2024; Rahayu et al., 2022; Ratnasari & Ansori, 2024). Elementary school children are a generation that grows up with digital devices, so they are familiar with animations, interactive visuals, and tech-based activities (Saifuddin & Putra, 2024). Therefore, using digital media in learning not only serves as a way to deliver material but can also boost student engagement, motivation, and learning experiences (Gil et al., 2025; Martzog & Suggate, 2022).

Along with these developments, gamification has become one of the innovations widely used in learning. Gamification integrates various game elements, such as levels, challenges, and rewards, to boost students' intrinsic motivation and engagement (Cattoni et al., 2024; Segura et al., 2025). Several studies report that gamification can increase learning participation, strengthen motivation, and create a more enjoyable learning experience compared to conventional learning (Jayanti et al., 2024). Additionally, Shimizu & Santos (2025) show that implementing gamification can enhance student engagement in language learning through more interactive learning activities.

Even so, previous research also shows that using digital media or gamification still has some limitations. Most studies focus on boosting learning motivation or general learning outcomes, while media specifically created to strengthen early writing skills for first-grade elementary students is still pretty limited. On the other hand, the digital media that has been developed generally hasn't integrated the early writing skill development stages with gamification elements that provide gradual practice, challenges that match students' development, and rewards that can keep learning motivation going in the long run. As a result, the available media hasn't fully been able to meet the literacy learning needs in the early grades of elementary school.

Various studies show that digital media and gamification have great potential to improve the quality of learning. However, previous research still leaves some research gaps that need attention. First, most studies focus more on increasing learning motivation, learning outcomes, or reading skills, while research specifically developing gamified digital media to strengthen early writing literacy for first-grade elementary students is still very limited (Jayanti et al., 2024; Segura et al., 2025). Second, the learning media that have been developed generally apply gamification elements as a supplement to learning activities, but they haven't been systematically designed to support the stages of writing literacy development, from letter recognition, word formation, creating simple sentences, to the ability to express ideas in writing. Third, most studies focus more on evaluating the increase in students' motivation or perception of the media, while empirical evidence about the impact of gamified digital media on early writing literacy skills is still relatively limited.

This gap shows that developing learning media is not enough just by using digital technology or adding game elements, but it needs to be designed based on the characteristics of literacy development in early elementary school students. At this stage, students need learning experiences that allow them to practice gradually, as well as receive positive reinforcement that can maintain their motivation during the learning process (Kabel et al., 2022; Syukri et al., 2025). Therefore, integrating digital media with gamification should be aimed not only at increasing students' interest in learning but also at facilitating the development of writing skills through systematic learning activities that match the developmental needs of the students.

Based on this condition, this study developed a digital media based on gamification specifically designed to strengthen beginning writing literacy for first-grade elementary school students. Unlike previous studies, the media developed not only uses digital technology as a means of delivering material or just adding game elements in learning, but integrates gamification elements into the entire writing learning process. This media presents learning activities gradually, starting from word recognition, composing simple sentences, to writing exercises based on pictures and everyday experiences. Each activity is supported by game elements such as levels, challenges, and immediate rewards designed to maintain student engagement while providing a more meaningful learning experience.

This integration is the novelty of this study because it connects the principles of gamification with the stages of early writing literacy development in first-grade elementary school students. Previous studies generally positioned gamification as a strategy to boost learning motivation, while this study uses gamification as a pedagogical mechanism that supports the gradual construction of writing skills. Therefore, the developed media is expected not only to increase students' interest in learning but also to help them build writing abilities through active, enjoyable, and student-centered learning experiences.

Besides bringing innovation to media design aspects, this study also contributes to the development of Indonesian language learning in elementary schools. Theoretically, it expands research on integrating gamification into early writing literacy learning by showing that game elements not only serve as motivation boosters but also as a pedagogical strategy to support the development of students' writing skills. Pedagogically, this study offers a more interactive, contextual learning alternative that matches the developmental characteristics of early elementary students. Practically, this study produces gamification-based digital media that teachers can use as a learning innovation in Indonesian language classes to strengthen writing literacy while also boosting student engagement in the learning process.

Based on the description, this study aims to develop and evaluate gamification-based digital media designed to address students' low skills in writing while also strengthening the early writing literacy of first-grade elementary school students. Specifically, this study analyzes the needs for media development, tests the feasibility of the media based on expert and user assessments, and evaluates the effectiveness of the media in improving students' writing literacy skills. The results of this study are expected to provide an empirical basis for the use of gamification-based digital media as an effective learning innovation in supporting the strengthening of writing literacy in primary education.

Method

Research Design

The development of the digital learning media was carried out using the ADDIE model, which includes the stages of analysis, design, development, implementation, and evaluation (Mulyatiningsih, 2019). This procedure was integrated into a Research and Development (R&D) methodology because the study focused on producing a gamification-based learning medium and examining its feasibility and effectiveness in improving the writing literacy of first-grade elementary school students through classroom application (Ibrahim et al., 2023).

During the Analysis phase, learning needs were identified through classroom observations, interviews with teachers and students, and a review of the instructional media currently used in the classroom. This stage examined students' characteristics, challenges encountered in developing writing literacy, teachers' expectations regarding instructional media, and the availability of facilities and technological resources that could support the implementation of digital learning.

The Design phase focused on planning the structure and features of the gamification-based digital media. This process included organizing learning materials, developing the navigation system and user interface, designing learning activities, integrating gamification components such as levels, challenges, and reward mechanisms, and preparing the research instruments required for data collection and evaluation. The Development phase focused on producing the digital media based on the prepared design. The product was then reviewed by subject matter and media experts, and their feedback was used to revise and improve the media before classroom use. The Implementation phase involved a limited trial with first-grade elementary school teachers and students to examine the practicality of the developed media. The

Evaluation phase assessed the quality and effectiveness of the media using expert validation, user responses, and students' writing test results. Both formative and summative evaluations were conducted to ensure that the media was feasible and effective for learning can be seen in Figure 1.

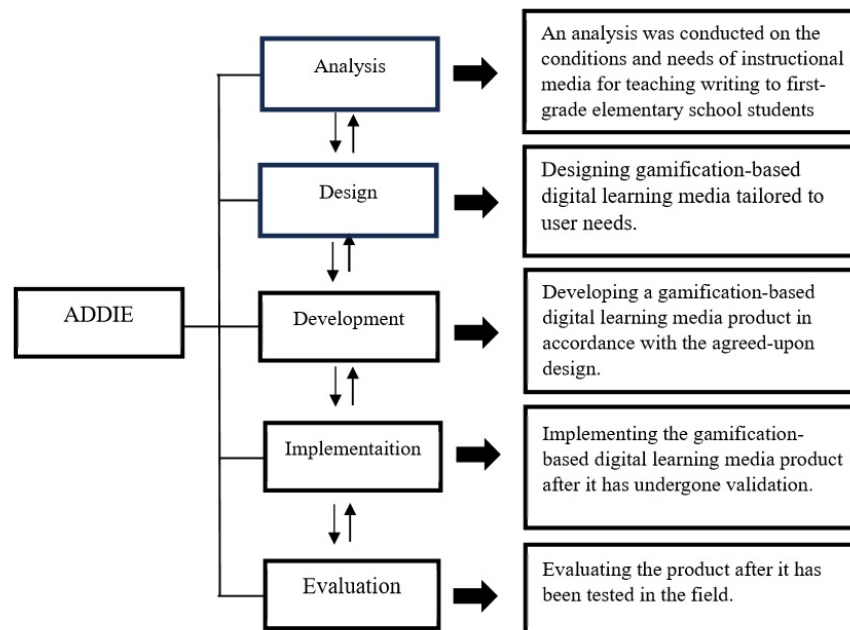


Fig 1. Research flow

Research Subjects

The research was carried out on first-grade elementary school students in Madiun City, involving 110 participants, which included first-grade teachers, first-grade students, a content expert, and a media expert. The school selection was done using purposive sampling, meaning schools that had implemented the Merdeka Curriculum and had technology facilities that supported the use of digital media. In the effectiveness test, students were divided into two groups: the experimental class and the control class. Each group consisted of 28 students, so the total number of participants in the effectiveness test stage was 56 students. The class teacher acted as the learning facilitator while also providing assessments of the media that was developed.

Data Collection Techniques

The research used several data collection techniques adjusted to the research objectives. Observations were used to identify the conditions of writing literacy learning, student characteristics, the media used by teachers, and learning facilities. Semi-structured interviews were conducted with teachers and students to obtain information about the needs for learning media, obstacles in writing learning, and the characteristics of the media that are desired. Validation questionnaires were used to get assessments from content experts and media experts. The content expert instrument includes aspects such as curriculum suitability and learning outcomes, accuracy and depth of the material, systematics and sequence of presentation, suitability with student characteristics, language quality, as well as the quality of exercises and learning evaluation. The media expert instrument includes display design, gamification elements, technical and functional aspects, and the quality of learning interaction. Assessment uses a five-point Likert scale, ranging from a score of 1 (strongly not suitable) to a score of 5 (very suitable). The user questionnaire is given to teachers to evaluate the suitability of the material and curriculum quality in language, display design and interactivity, gamification elements, technical aspects, and usefulness. Besides that, it is also used by students, covering aspects such as visual appeal, ease of use, clarity of material, game elements, and learning engagement. A writing literacy test is used to measure students' writing skills. The test is developed based on the learning outcomes of the first-grade Indonesian language curriculum and includes the ability to recognize words, arrange words, write simple sentences, and express simple experiences in writing. All instruments are validated through expert judgment by content and media experts before being used in the research to ensure content validity.

Data Analysis Techniques

This study adopted a mixed methods approach by integrating qualitative and quantitative data analysis. Qualitative data collected through observations, interviews, and open-ended questionnaire responses were analyzed using the Miles, Huberman, and Saldaña model to identify learning needs and

support product improvement. Meanwhile, quantitative data from expert validation, teacher and student evaluations, and writing literacy tests were analyzed using descriptive statistics and an Independent Samples t-test. Prior to hypothesis testing, the data were examined for normality using the Kolmogorov-Smirnov test and for homogeneity using Levene's test. The developed media was considered effective when the significance value was below 0.05 and the experimental group demonstrated higher writing literacy scores than the control group.

Results and Discussion

1. Analysis

The needs analysis was carried out through classroom observations, interviews with teachers and students, and a study of the learning media used in first grade of elementary school. This analysis aims to identify the problems in writing instruction and to determine the characteristics of media needed to support strengthening students' writing literacy. The results of the analysis can be seen in the Table 1.

Table 1. Result Analysis

<i>Aspect</i>	<i>Findings</i>
Writing learning conditions	Students are still copying letters/words; interest in writing is low; focus is quickly lost; writing creativity is not yet optimal.
Learning media used	Dominance of textbooks and worksheets; digital media is limited, less interactive, and does not provide immediate feedback.
Student characteristics	First-grade students are interested in playing and challenges; have a short attention span; need visual stimulation
Specifications of required media	Includes games, levels, rewards; gradually progresses from letters to simple sentences; attractive illustrations; accessible on tablets/smartphones.
Teacher and student needs	Teachers need learning media that are easy to use and can monitor students' writing literacy progress in real time. Students need media that are enjoyable and include features such as challenges, rewards, and writing materials that are gradually tailored to their initial abilities.
Facilities and infrastructure	The observation results indicate that the facilities in the first-grade classroom of the elementary school are adequate to support literacy learning through digital media.

The needs analysis shows that writing literacy learning for first-grade elementary students still faces several challenges. Students tend to just copy letters and words, have low interest in writing, and easily lose focus, so their writing creativity hasn't developed optimally. On the other hand, the learning media used is still dominated by textbooks and worksheets, while the use of interactive digital media that provides direct feedback is still limited. The analysis also showed that first-grade students are more interested in playing activities, challenges, and visual stimulation. Therefore, the media needed should integrate gamification elements like levels, challenges, and writing activities arranged gradually from letter introduction to forming simple sentences. Teachers also want media that is easy to use and can track students' writing literacy development. In addition, observations showed that the school's facilities and infrastructure are adequate to support the implementation of gamified digital media in teaching writing literacy.

2. Development

The development phase was carried out to produce a product in the form of gamification-based digital media as a learning tool for writing literacy for first-grade elementary school students. At this stage, the media was developed based on the design established in the planning phase. The resulting learning media contains components of learning outcomes and objectives, media usage guidelines, examples of writing activities, game-based exercises, as well as the developer's profile. The material was compiled gradually, starting from the introduction to word formation, to the construction of simple sentences guided by pictures, and has been aligned with the curriculum and learning objectives for first-grade elementary school students. The media is also equipped with gamification elements such as challenges to increase students' learning motivation. Figure 2 is an example of the gamification-based digital media product display that has been developed.

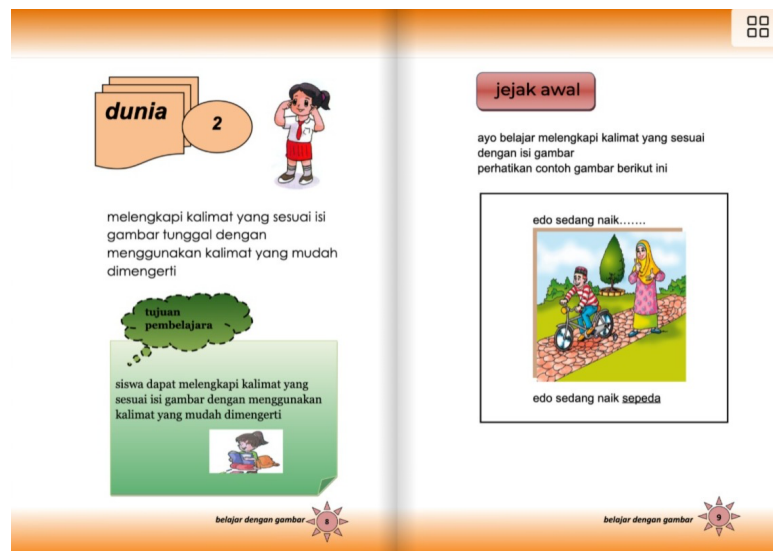


Fig 2. Digital Media

The gamification-based digital media were designed to address the writing literacy needs of first-grade elementary school students. After the development process, the product was evaluated by subject matter experts and digital media experts to determine its feasibility. Their feedback was used to revise and improve the media before it was implemented in the learning process. The results of the material and digital media validation are presented in Table 2.

Table 2. Material Validation Results

<i>Num</i>	<i>Aspect</i>	<i>Score</i>
1	Curriculum Alignment and Learning Outcomes	80
2	Accuracy and Depth of Material	85
3	Systematics and Sequence of Presentation	75
4	Suitability for Student Characteristics	80
5	Language Quality	95
6	Quality of Exercises and Evaluation	75
Average		81,7
Category		Highly Feasible

Based on Table 2, the average score obtained was 81.7, which falls under the 'very feasible' category. The highest score was achieved in the language quality aspect, indicating that the language used in the media is suitable for first-grade elementary school students and is easy to understand. On the other hand, the learning evaluation aspect received a relatively lower score compared to the other aspects. This finding suggests that the media has good content quality but still needs improvement in the variety of evaluation methods to provide more comprehensive information about students' writing development can be seen in Table 3.

Table 3. Media Validation Results

<i>Num</i>	<i>Aspect</i>	<i>Score</i>
1	Display Design	84
2	Gamification Elements	70
3	Technical and Functional Aspects	80
4	Quality of Learning Interaction	86,7
Average		80,2
Category		Feasible

The results of the media expert validation showed an average score of 80.2, which falls into the feasible category. The aspect of learning interaction quality received the highest score, indicating that the media can encourage student engagement during the learning process. On the other hand, the gamification aspect received the lowest score compared to the other aspects. Nevertheless, the score is still in the feasible category, so the media can be used in learning after making improvements to the variety of challenges and reward system. Overall, the validation results show that the media has met both pedagogical and technical requirements for use in writing literacy learning. After being revised based on input from experts, the media

was implemented in learning and then evaluated by teachers and students as the main users. The implementation stage was carried out by using gamification-based digital media in the literacy writing activities of first-grade elementary school students in a real classroom. At this stage, teachers used the media as part of the learning process, while students interacted directly with the available features and activities. The purpose of this implementation was to see how well the media was used and to observe the responses of both students and teachers during the learning process. After the lesson, teachers and students provided evaluations of the digital media. The evaluation results from the users can be seen in Table 4.

Table 4. Teacher Evaluation Results

<i>Num</i>	<i>Aspect</i>	<i>Score</i>
1	Material and Curriculum Relevance	80
2	Language Quality	90
3	Design and Interactivity	85
4	Gamification Elements	65
5	Technical Aspects and Usefulness	90
	Average	82
	Category	Highly Feasible

Teacher evaluations received an average score of 82, falling into the very feasible category. The highest scores were in the aspects of language quality and media usefulness, indicating that the media is easy to use in the learning process and helps teachers present writing materials in a more engaging way. Meanwhile, the gamification aspect scored relatively lower than the others. This finding shows that even though game elements support learning, there's still room to develop a wider variety of game activities to keep students motivated to learn for longer periods can be seen in Table 5.

Table 5. Student Evaluation Results

<i>Num</i>	<i>Aspect</i>	<i>Score</i>
1	Visual Appeal	77,32
2	Ease of Use	91,25
3	Clarity of Material	81,25
4	Game Elements	85,71
5	Learning Engagement	78,21
	Average	82,75
	Category	Highly Feasible

Student assessments received an average score of 82.75, falling into the very feasible category. The ease of use aspect scored the highest, showing that first-grade students can operate the media independently with help from the teacher. Additionally, the game aspect also received high marks, indicating that the integration of gamification elements can create an enjoyable learning experience. However, the learning engagement aspect received a slightly lower score compared to the other aspects, suggesting the need to develop more varied game activities to keep students' attention during lessons.

3. Effectiveness Test

Before conducting hypothesis testing, the data is first tested using normality and homogeneity tests to ensure that the data meets the assumptions of parametric analysis.

Normality Test

The normality test is conducted to determine whether the data in each group are normally distributed. Normal distribution is one of the main assumptions required for conducting parametric statistical tests such as the independent t-test can be seen in Table 6.

Table 6. Normality Test

		<i>Experimental Class</i>	<i>Control Class</i>
N		28	28
Normal Parameters ^{a,b}	Mean	85.7143	77.5000
	Std. Deviation	7.90151	7.99305
Most Extreme Differences	Absolute	.143	.127
	Positive	.143	.127
	Negative	-.107	-.127
Test Statistic		.143	.127
Asymp. Sig. (2-tailed) ^c		.148	.200 ^e

The normality test results show that the significance values in both the experimental class and the control class are greater than 0.05. Therefore, the research data is normally distributed, meeting the requirements for a parametric test.

Homogeneity Test

The homogeneity test is used to examine whether the variances of the experimental and control groups are equal. Homogeneous variance is another important assumption for the independent t-test can be seen in Table 7.

Table 7. Homogeneity Test

<i>Levene Statistic</i>	<i>df1</i>	<i>df2</i>	<i>Sig.</i>
0.027	1	54	0.870

The homogeneity test results showed a significance value of 0.870, which is greater than 0.05. This indicates that the variances of the two groups are homogeneous, so the analysis can continue using the Independent Samples t-test.

T-Test

The independent t-test is performed to determine whether there is a significant difference in the mean scores between the experimental and control groups can be seen in Table 8.

Table 8. T-Test

<i>Class</i>	<i>Mean</i>	<i>Std. Dev</i>	<i>Std Error Mean</i>	<i>Independent t-Test</i>		
				<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>
Experiment	85.71	7.9	1.49	3.867	54	0.000
Control	77.5	7.99	1.51			

The results of the Independent Samples t-test showed that the average writing literacy skills of students in the experimental class reached 85.71, while in the control class it was 77.50. This difference was statistically significant with a t-value of 3.867 and $p < 0.001$. The average difference of 8.21 points indicates that using gamification-based digital media provides a higher improvement in writing literacy skills compared to conventional learning. These findings suggest that the media developed is not only suitable for use based on expert validation and user assessment results but is also effective in enhancing first-grade elementary students' writing literacy skills. This improvement shows that integrating gradual writing activities with gamification elements can create a more engaging learning experience and support the development of students' writing skills in early elementary school can be seen in Figure 3.

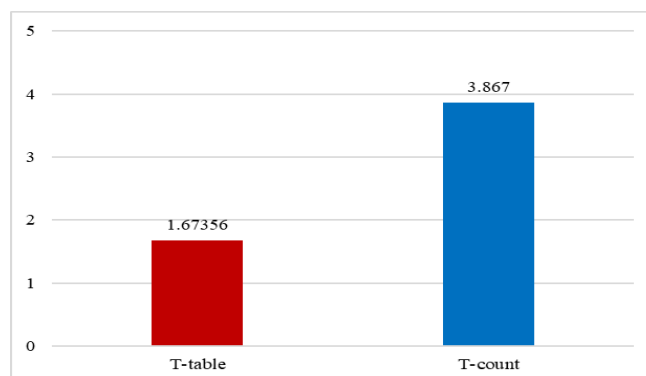


Fig 2. Comparison between T Count and T Table

The results of the Independent Samples t-test showed that the average writing literacy skills of students in the experimental class reached 85.71, while in the control class it was 77.50. This difference was statistically significant with a t-value of 3.867 and $p < 0.001$. The average difference of 8.21 points indicates that using gamification-based digital media provides a higher improvement in writing literacy skills compared to conventional learning. These findings suggest that the media developed is not only suitable for use based on expert validation and user assessment results but is also effective in enhancing first-grade elementary students' writing literacy skills. This improvement shows that integrating gradual writing activities with gamification elements can create a more engaging learning experience and support the development of students' writing skills in early elementary school.

Students who enjoy playing, challenges, and visual stimulation show that writing learning needs to be supported by more interactive media. Therefore, digital media based on gamification have been developed by integrating elements like levels, challenges, and rewards to create a more engaging learning experience while gradually supporting the development of writing literacy. These findings back up the research by Segura et al. (2025), which state that gamification can boost students' motivation and engagement in learning. Unlike previous research that focused more on boosting learning motivation, this study shows that gamification can also be a teaching strategy to support the development of writing literacy through activities designed according to the skill levels of early grade students. In this way, the needs analysis results provide a solid foundation for developing digital media that is not only engaging but also fits the students' characteristics and the writing learning needs in elementary schools (Maisarah et al., 2022).

The validation results show that the gamification-based digital media developed received the categories of feasible and very feasible based on evaluations by material experts and media experts. These assessments indicate that the media meets the necessary aspects, so it can be used for teaching writing literacy in first-grade elementary school. The high scores in language aspects suggest that the material is presented using simple, communicative sentences suitable for the cognitive development level of early-grade students. This is important because using appropriate language will make it easier for students to understand instructions and carry out writing activities independently. According to Martin & Dockrell (2024) learning media tailored to students' developmental characteristics can help improve understanding and support the gradual development of writing literacy skills.

On the other hand, the results of media expert validation showed that the learning interaction aspect received a high rating, while the gamification aspect still needs some improvement. These findings indicate that the success of digital media is not only determined by the quality of its visual design, but also by the media's ability to create interactions that encourage student engagement during the learning process. Therefore, input from experts was used to improve the variety of challenges so that the learning experience becomes more engaging while still remaining focused on achieving learning objectives. These findings align with Cattoni et al. (2024), who stated that the effectiveness of gamification depends on the integration of game elements and learning activities, which can increase student participation without diminishing the content substance.

The validation process also shows that media development is not only focused on aesthetic aspects but also on the pedagogical quality of the final product. This aligns with Segura et al. (2025), who emphasize that gamification-based media should be designed according to learning needs so that every game element has an educational function. Therefore, the validation results in this study not only prove that the developed media is suitable for use but also show that the refinement process based on expert feedback successfully produced gamification-based digital media that fits the characteristics of first-grade elementary students and has the potential to support more effective writing literacy improvement.

The validation process also shows that media development is not only focused on aesthetic aspects but also on the pedagogical quality of the final product. This aligns with Segura et al. (2025), who emphasized that gamification-based media should be designed according to learning needs so that every game element has an educational function. Therefore, the validation results in this study not only prove that the developed media is feasible to use but also show that the refinement process based on expert feedback successfully produced gamification-based digital media that suits the characteristics of first-grade elementary students and has the potential to support more effective writing literacy improvement.

The evaluation results from teachers and students show that gamification-based digital media is considered very suitable for use in teaching writing literacy. The high ratings from teachers indicate that the media is easy to operate, aligns well with the learning material, and helps teachers present writing lessons in a more engaging and organized way. Additionally, the media makes it easier for teachers to provide step-by-step writing exercises and monitor students' progress throughout the learning process. These findings suggest that the developed media not only serves as a learning tool but also supports teachers in conducting more effective, student-centered lessons. According to Maula & Antara (2024), digital media designed to meet learning needs can enhance the quality of interaction between teachers, students, and learning materials.

Students also showed a positive response through high ratings on ease of use, media appearance, and the game activities presented. This shows that the media fits the characteristics of first-grade elementary students who are more interested in visual, interactive, and fun learning. Integrating gamification elements like levels, challenges, and rewards can create a learning experience that encourages students to complete each writing activity step by step. These results align with the research of Jayanti et al. (2024) and Shimizu & Santos (2025), which state that gamification can increase student engagement because it provides a more interesting learning experience compared to conventional learning.

Even though it received very good ratings, some aspects of gamification can still be developed, especially in adding a variety of challenges and types of rewards so that students' learning motivation can be maintained for a longer period. These findings show that the success of digital media is not only influenced by attractive visual displays but also by the quality of learning activity design that can integrate game elements with learning objectives. Therefore, the high response from teachers and students proves that gamification-based digital media has a high level of acceptance and has the potential to become an innovative alternative in strengthening first-grade elementary students' writing literacy.

The effectiveness test results show that students' writing literacy skills who use gamified digital media are higher than those who do not use gamified digital media. This difference is not only statistically significant, but also shows that the developed media can provide a learning experience that better fits the characteristics of first-grade elementary school students. The improvement in writing skills happens because students get the chance to learn step by step, starting from recognizing letters, forming words, to writing simple sentences through interactive and contextual activities. This finding aligns with Martin & Dockrell (2024), who stated that writing learning is more effective when students get learning experiences that are systematic and match their developmental stage.

The effectiveness of media is also influenced by the use of gamification elements integrated into each learning activity. Level elements help students complete writing tasks gradually according to difficulty, reducing learning load and boosting confidence. Meanwhile, challenge elements encourage students to keep completing each writing activity as part of a learning mission. Giving rewards after students successfully complete tasks provides positive reinforcement that increases learning motivation. In this way, each gamification element has a pedagogical function that complements one another in supporting the development of writing literacy. These findings support the research of Segura et al. (2025), Cattoni et al. (2024), and Jayanti et al. (2024), which states that the effectiveness of gamification doesn't just come from game elements, but how those elements are designed to support the learning process.

This study also provides a different contribution compared to previous research. Most earlier studies focused more on how gamification could boost students' motivation or engagement in learning. However, this study shows that gamification can also strengthen writing literacy skills if combined with writing activities arranged step by step according to the development of early grade students. Thus, the improvement in students' writing skills is not merely due to the use of digital media, but because of the integration between writing learning strategies and gamification elements designed systematically. These findings support the view that gamification-based digital media can be an innovative alternative in Indonesian language learning, especially to strengthen writing literacy in first-grade elementary students.

Conclusion

This study shows that gamification-based digital media that was developed is effective in strengthening first-grade elementary students' writing literacy through the integration of gradual writing activities with gamification elements like levels, challenges, and rewards. The developed media not only meets the eligibility criteria in terms of content, language, appearance, and technical aspects but also has been proven to boost students' engagement and writing literacy skills compared to learning that doesn't use digital media. These findings provide empirical evidence that the effectiveness of digital media in writing education is determined not just by the use of technology but also by a pedagogical design that systematically integrates gamification elements according to the developmental characteristics of early-grade students' literacy. Theoretically, this study expands research on gamification by showing that game elements not only help boost learning motivation but can also support the development of writing literacy skills through a gradual and meaningful learning process. From a pedagogical perspective, the study's results offer an innovative alternative for teaching Indonesian, helping teachers create writing lessons that are more interactive, engaging, and student-centered. The novelty of this research lies in the development of gamification-based digital media specifically designed to strengthen early writing literacy by integrating progressive writing activities with gamification elements in a single learning tool. Even so, this study is still limited to implementation on first-grade elementary school students and measuring effectiveness in the short term. Therefore, future research can test the application of media at a broader level and context to get an idea of the sustainability of its impact on students' writing literacy development.

Declarations

- Author contribution** : Cerianing Putri Pratiwi served as the principal researcher coordinating the entire research process, from design to reporting the results. Heny Kusuma Widyaningrum was involved in data collection and processing, analyzing findings, and refining the manuscript. Nico Irawan contributed by participating in compiling the research results.
- Funding statement** : This research did not receive any funding.
- Conflict of interest** : All authors declare that they have no competing interests.
- Ethics Approval** : Information on Ethics Approval and informed consent statements are required for all articles published in BAHASTRA since 2025.
- Additional information** : No additional information is available for this paper.

References

- Arianti, F. F., Sutrimah, S., & Hasanudin, C. (2021). Flipped classroom dan aplikasi schoology: Analisis keterampilan menulis teks biografi. *Tabasa: Jurnal Bahasa, Sastra Indonesia, dan Pengajarannya*, 1(2), 165–186. <https://doi.org/10.22515/tabasa.v1i2.2591>
- Arrimada, M., Torrance, M., & Fidalgo, R. (2022). Response to Intervention in first-grade writing instruction: A large-scale feasibility study. *Reading and Writing*, 35(4), 943–969. <https://doi.org/10.1007/s11145-021-10211-z>
- Cattoni, A., Anderle, F., Venuti, P., & Pasqualotto, A. (2024). How to improve reading and writing skills in primary schools: A comparison between gamification and pen-and-paper training. *International Journal of Child-Computer Interaction*, 39(1), 1–13. <https://doi.org/10.1016/j.ijcci.2024.100633>
- Debaryshe, B. D. (2023). Supporting emergent writing in preschool classrooms: Results of a professional development program. *Educ. Sci*, 13, 1–18. <https://doi.org/10.3390/educsci13090961>
- Fahira, W., & Iswara, P. D. (2023). Analysis of students difficulties in early writing learning at the elementary school level. *Lembaran Ilmu Kependidikan*, 52(2), 97–109.
- Gil, M. M., Cunha, A. J., Pereira, I. S. P., & Sylla, C. M. (2025). The use of digital tools to enhance writing in primary school through hybrid practices: A multisite qualitative study. *Journal of Education*, 0(0), 1–14.
- Hanifa, M., Syam, S. S., Guru, P., Dasar, S., & Padang, U. N. (2025). Analisis kemampuan menulis permulaan siswa kelas 1 sekolah dasar. *Morfologi: Jurnal Ilmu Pendidikan, Bahasa, Sastra, dan Budaya*, 3(3), 65–74. <https://doi.org/10.61132/morfologi.v3i3.1620>
- Ibrahim, F., Hendrawan, B., & Sunanilh, S. (2023). Pengembangan media pembelajaran PACAS untuk meningkatkan hasil belajar siswa. *JLEB: Journal of Law, Education, and Business*, 1(2), 102–108. <https://doi.org/10.57235/jleb.v1i2.1192>
- Inggriyani, F., & Pebrianti, N. A. (2021). Analisis Kesulitan keterampilan menulis karangan deskripsi peserta didik di sekolah dasar. *Didaktik: Jurnal Ilmiah PGSD STKIP Subang*, 7(01), 1–22. <https://doi.org/10.36989/didaktik.v7i01.175>
- Jayanti, W. M. M., Firdaus, M. Y., & Arochman, T. (2024). The effectiveness of integrating classcraft: A gamified learning platform on enhancing writing skills among elementary school learners. *English Learning Innovation*, 5(2), 277–286. <https://doi.org/10.22219/englie.v5i2.35022>
- Kabel, K., Bremholm, J., & Bundsgaard, J. (2022). A framework for identifying early writing development. *writing & pedagogy*, 13(1), 51–88. <https://doi.org/10.1558/wap.21467>
- Kadek, N., Putri, S., & Ganing, N. N. (2024). Dampak project based learning berbasis literasi terhadap keterampilan menulis dalam pembelajaran Bahasa Indonesia sekolah dasar. *Indonesian Journal of Instruction*, 5(2), 160–170. <https://doi.org/10.23887/iji.v5i2.78069>
- Kim, Y.-S. G., Yang, D., Reyes, M., & Connor, C. (2021). Writing instruction improves students' writing skills differentially depending on focal instruction and children: A meta-analysis for primary grade students. *Educational Research Review*, 34, 1–16. <https://doi.org/10.1016/j.edurev.2021.100408>
- Maisarah, M., Lestari, T. A., & Sakulpimolrat, S. (2022). Urgensi pengembangan media berbasis digital pada pembelajaran Bahasa Indonesia. *EUNOIA (Jurnal Pendidikan Bahasa Indonesia)*, 2(1), 65. <https://doi.org/10.30821/eunoia.v2i1.1348>
- Majorano, M., Bastianello, T., & Bodea, C. (2021). Early literacy skills and later reading and writing performance across countries: The Effects of orthographic consistency and preschool curriculum. *Child & Youth Care Forum*, 50(6), 1063–1085. <https://doi.org/10.1007/s10566-021-09611-7>
- Martin, C., & Dockrell, J. E. (2024). Writing productivity development in elementary school: A systematic review. *Assessing Writing*, 60(March), 1–16. <https://doi.org/10.1016/j.asw.2024.100834>

- Martzog, P., & Suggate, S. P. (2022). Screen media are associated with fine motor skill development in preschool children. *Early Childhood Research Quarterly*, 60, 363–373. <https://doi.org/10.1016/j.jecresq.2022.03.010>
- Mathew, K. A., Lee, V. J., Gentile, C., Hanna, C., & Montgomery, A. (2025). Empowering young writers: A multimodal case study of emergent writing in urban preschool classrooms. *Early Childhood Education Journal*, 53(6), 2039–2052. <https://doi.org/10.1007/s10643-024-01831-5>
- Maula, I. K., & Antara, P. A. (2024). Buku interaktif digital media inovatif untuk meningkatkan literasi baca tulis kelas i sekolah dasar. *Jurnal Penelitian dan Pengembangan Sains dan Humaniora*, 8(2), 252–260. <https://doi.org/10.23887/jppsh.v8i2.77962>
- Mulyatiningsih, E. (2019). *Metode penelitian terapan bidang pendidikan*. Alfabeta.
- Nurazizah, S. A., & Darmayanti, M. (2024). Keterampilan menulis siswa sekolah dasar: Systematic literature review dan bibliometric analysis. *Aksara*, 36(2), 337–359. <https://aksara.kemendikdasmen.go.id/index.php/aksara/article/view/4236>
- Pratiwi, C. P., & Alfianti. (2023). Contribution of digital books to online learning in lecturers and student perceptions. *Premiere Educandum: Jurnal Pendidikan Dasar dan Pembelajaran*, 13(1), 49–61. <https://doi.org/10.25273/pe.v13i1.14934>
- Pratiwi, C. P., Irma, C. N., & Ivanka, A. B. (2024). Developing flipbooks and wordwall-assisted digital media for teaching procedural writing in elementary schools. *EDUKASIA: Jurnal Pendidikan dan Pembelajaran*, 5(2), 279–294. <https://doi.org/10.62775/edukasia.v5i2.1394>
- Rahayu, R., Iskandar, S., & Abidin, Y. (2022). Inovasi pembelajaran abad 21 dan penerapannya di Indonesia. *Jurnal Basicedu*, 6(2), 2099–2104. <https://doi.org/10.31004/basicedu.v6i2.2082>
- Ratnasari, D., & Ansori, I. (2024). Media smart apps creator berbasis problem based learning meningkatkan kemampuan menulis kalimat efektif. *Jurnal Penelitian dan Pengembangan Pendidikan*, 8(1), 10–21. <https://doi.org/10.23887/jppp.v8i1.68614>
- Razanah, M., & Solihati, N. (2022). Pentingnya pembelajaran menulis puisi di sekolah di era society 5.0. *Jurnal Literasi*, 6(2), 244–250. <https://doi.org/10.25157/literasi.v6i2.7681>
- Saifuddin, M. F., & Putra, L. D. (2024). Digital literacy in elementary school: A systematic literature review. *Gagasan Pendidikan Indonesia*, 5(2), 86–99. <https://jurnal.untirta.ac.id/index.php/GAGASAN/article/view/24830>
- Sapkota, S., & Gnawali, L. (2025). Effective writing instruction for students in elementary level who find writing challenging: evidence-based practices. *The Harvest*, 4(1), 75–84. <https://doi.org/10.3126/harvest.v4i1.75357>
- Saputra, M. D., Jampel, I. N., & Wibawa, I. M. C. (2024). Literacy learning reading writing in elementary schools. *International Journal of Language and Literature*, 8(4), 172–182. <https://doi.org/10.23887/ijll.v8i4.93956>
- Sari, P., Yani, A., & Mukhaira, S. (2024). Improving writing skills in early children. *International Conference on Islamic Education and Islamic Business (ICoBEI) Islamic Studies Faculty Universitas Islam Riau*, 1(1), 387–392.
- Segura, J. E. C., Gruezo, C. del R. H., Sánchez, J. del C. P., & Rangel, D. R. (2025). Gamified activities around language and literature for elementary schoolstudents. *Ciencia Digital*, 9(4), 206–225. <https://doi.org/10.33262/cienciadigital.v9i4.3563>
- Shafiee, H., & Alipour, R. (2024). Unlocking writing success: Building assessment literacy for students and teachers through effective interventions. *Assessing Writing*, 59(December 2023), 1–26. <https://doi.org/10.1016/j.asw.2023.100804>
- Shimizu, A. Y., & Santos, J. (2025). Supporting online learning for diverse elementary students : A community of inquiry approach to collaborative multimodal composing—processes, products, and perspectives. *Computers and Composition*, 78(1), 1–20. <https://doi.org/10.1016/j.compcom.2025.102959>
- Su, M., Fan, Y., Wu, J., & Qiao, B. (2022). The influence of the literacy environment on children's writing development in Chinese. *Front. Psychol*, 13(October), 1–12. <https://doi.org/10.3389/fpsyg.2022.1010471>
- Suryadi, E., Milawasri, & Lustina. (2022). Pengaruh model pembelajaran berbasis masalah terhadap kemampuan menulis teks prosedur siswa. *Jurnal Bindo Sastra*, 6(1), 15–26. <https://doi.org/10.32502/jbs.v6i1.3503>
- Syukri, R. A., Raldiastari, S., & Arif, T. A. (2025). Development of concrete media in reading and writing literacy of grade 1 elementary school students in region III , Bataiaworu District. *International Journal of Education and Literature*, 4(2), 107–109. <https://doi.org/10.55606/ijel.v4i2.239>

- Truxius, L., Wyss, J. S., & Maurer, M. N. (2025). Early handwriting development: A longitudinal perspective on handwriting time, legibility, and spelling. *Front. Psychol*, 15(1), 1–7. <https://doi.org/10.3389/fpsyg.2024.1466061>
- Tyson, L. S. (2024). Learning to read and write is to defend yourself': Exploring indigenous perspectives and reimagining literacies for self-determination in Mexico. *International Journal of Educational Development*, 106(1), 1–10. <https://doi.org/10.1016/j.ijedudev.2024.102992>
- Utami, S., & Purwanta, E. (2025). Improving early writing skills through play-based learning with loose parts: A classroom action research with children with learning difficulties. *Journal of Innovation and Research In Primary Education*, 4(4), 3800–3809. <https://doi.org/10.56916/jirpe.v4i4.2503>
- Venturaa, A. C., Scheuera, N., & Pozo, J. I. (2020). Elementary school children's conceptions of teaching and learning to write as intentional activities. *Learning and Instruction*, 65(2), 1–10. <https://doi.org/10.1016/j.learninstruc.2019.101249>
- Yarmi, G. (2025). Developing a writing instruction model for primary schools based on ISM-DEMATEL to enhance students' literacy competence: An empirical evidence in Indonesia. *Social Sciences & Humanities Open*, 12(September), 1–13. <https://doi.org/10.1016/j.ssaho.2025.101963>