



Development and Validation of the NAI (Narration–Animation–Interactivity) Framework for PowerPoint-Based Procedural Writing in Elementary Schools

Ina Maryana¹, Dian Indihadi^{2*}

¹²Universitas Pendidikan Indonesia

*Corresponding Author, Email: inamaryana@upi.edu

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Abstract: This study aims to develop learning media based on the NAI (Narrative, Animation, Interactivity) framework, using Microsoft PowerPoint, that meet the criteria of validity, practicality, and effectiveness to improve the writing skills of third-grade elementary school students in procedural texts. The background of this study is the low achievement in students' writing skills, with 65% not meeting the Minimum Completion Criteria (KKM). The study used the ADDIE development model and was conducted at SDN I Cibanteng, Tasikmalaya, with 29 third-grade students as subjects. The developed media integrates audio narration for verbal explanation, animation to visualize procedural steps, and interactive features such as self-navigation and quizzes with automatic feedback. The validation results showed a very high level of feasibility, with assessments from material experts at 92.5% and media experts at 90.0%, both in the very feasible category. Practicality responses also showed positive results, with teacher assessments at 88.5% (very practical) and student assessments at 86.2% (very good). The effectiveness test showed a significant increase in the average score from pretest ($M=32.5$) to posttest ($M=42.7$), based on a paired t-test ($t=12.34$; $p<0.001$) and an N-Gain value of 0.66 (medium–high category). The learning completion percentage increased from 27.6% in the pretest to 86.2% in the posttest. These findings indicate that the NAI framework effectively bridges the gap in procedural writing learning through affordable, easy-to-implement technology, while enriching the application of multimedia theory in Indonesian elementary education.

Keywords: elementary school; interactive PowerPoint; multimedia learning; NAI media; procedural text; writing skills.

Introduction

The skill of writing procedural texts is one of the essential competencies in language learning in elementary schools. Procedural texts serve to provide systematic guidance or instructions so that readers can carry out an activity correctly and efficiently (Graham et al., 2018). This ability not only requires mastery of linguistic aspects, such as the choice of diction, the use of imperative verbs, and correct punctuation, but also trains students to think logically, systematically, and critically in arranging steps in a coherent manner. In the third grade of elementary school, mastery of procedural texts becomes an important foundation for the development of functional literacy that will influence students' academic success at the next level (Nurgiyantoro, 2018). Functional literacy is related to the ability to understand and produce texts that are useful in everyday life, such as instructions for use, simple recipes, or steps for making certain products.

However, the reality in the field shows that the achievement of procedural text writing competency is still far from the set expectations. Based on the results of a preliminary study conducted at SDN I Cibanteng, Tasikmalaya, data obtained showed that only 65% of third-grade students were able to achieve the Minimum Completion Criteria (KKM) with a maximum score of 50. Meanwhile, the school's targeted learning success standards require at least 80% of students to achieve or exceed the KKM. The gap between actual achievement and the target indicates that the learning process has not been optimal.

These findings indicate a fundamental problem in teaching procedural text writing. The low completion rate not only reflects students' limited ability to express ideas in writing, but also points to the possibility of inappropriate approaches, methods, and learning media used by teachers. Students appear to have difficulty understanding the structure of procedural texts, sequencing steps logically, and using language that conforms to linguistic rules. Therefore, systematic and innovative improvement efforts are needed to improve the quality of learning and optimally achieve the set completion targets.

Further observations revealed that learning is still dominated by conventional methods with one-way verbal explanations from teachers. The media used are limited to blackboards and textbooks, making procedural material that requires visual understanding of step-by-step sequences difficult for students to grasp (Nurkhodri & Dafit, 2022; Suharsono & Iqbal, 2025). Consequently, students experience difficulty identifying text structure, organizing steps sequentially, and using imperative verbs correctly. This condition is exacerbated by the lack of visual and interactive stimulation needed by elementary school students at the concrete operational stage (Piaget, 2018). At this stage, students tend to understand concepts more easily through concrete and visual representations than through purely abstract explanations.

Amid these challenges, advances in information and communication technology over the past decade have opened up significant opportunities for learning innovation. Various studies have shown that the use of interactive digital media can significantly increase student motivation, engagement, and understanding (Heinich et al., 2020; Mayer, 2009). Digital media enables multimodal presentation of material, combining elements of text, images, sound, and animation, making information more easily processed by students' brains. One platform that is easily accessible and familiar to teachers is Microsoft PowerPoint. This application has evolved from being a mere presentation tool to a medium capable of integrating text, images, audio, animation, video, and interactive features such as navigation buttons and quizzes (Smaldino et al., 2019). Dewi and Manuaba demonstrated that interactive PowerPoint effectively increases student interest and understanding in science subjects (Dewi & Manuaba, 2021). Other research reports that similar media can improve understanding of geometry concepts in third-grade elementary school students. The integration of interactive features in thematic learning has a positive impact on student motivation and learning outcomes (Anyan et al., 2020). However, the use of interactive PowerPoint in writing lessons, especially procedural texts, is still relatively limited.

The cognitive theory of multimedia (Moreno & Mayer, 2017) provides a strong foundation for the development of learning media that combine visual and auditory elements. This theory asserts that learning is more effective when information is presented through visual and auditory channels simultaneously, because the brain processes both types of information through different but complementary pathways. This principle is known as dual-channel processing, which is also supported by the dual coding theory (Paivio, 2020). The combination of animation as a visual representation and narrative as a verbal explanation can enhance understanding, strengthen retention, and facilitate the transfer of knowledge to new contexts.

Learning to write procedural texts in elementary school requires students to master the ability to organize ideas systematically, coherently, and logically. However, the main challenge often faced is the abstract nature of the material when presented only through static text. Mayer, in his Cognitive Theory of Multimedia Learning (CTML), emphasized that learning becomes more effective when information is presented through dual channels, namely visual and auditory, simultaneously (Mayer, 2014). This principle serves as a theoretical basis for the development of media that integrates narrative and animation to reduce students' extrinsic cognitive load. In the context of procedural writing, visualizing steps through animation helps students build concrete mental models before putting them into written form.

The use of technology in language learning in elementary schools has grown rapidly. Dewi and Manuaba demonstrated that interactive PowerPoint media can improve students' motivation and understanding in science subjects, but its use in Indonesian writing lessons remains limited (Dewi & Manuaba, 2021). Most previous studies, such as those by (Indriani et al., 2022), have focused on mathematics or science materials, leaving a gap in the literature regarding the effectiveness of interactive media for productive language skills such as writing. Wulandari added that media that is solely visual without interactivity tends to make students passive (Wulandari & Tanjung, 2021). Therefore, a more comprehensive framework is needed that not only presents material but also actively engages students in the learning process.

Referring to these opportunities and theoretical foundations, this study proposes an innovation in the form of interactive PowerPoint-based NAI (Narasi, Animasi, Interaktif) media. NAI is an acronym that summarizes three key elements: narrative to provide structured verbal explanations, animation to dynamically visualize procedural steps, and interactivity that allows students to actively participate through navigation, quizzes, and independent practice. The integration of these three elements creates a multimodal learning experience that is appropriate to the cognitive and affective characteristics of elementary school students (Moreno & Mayer, 2017; Santrock, 2019).

Literature review shows that research on interactive media for teaching procedural text writing is still very limited. Several studies have explored the use of digital media such as flipbooks (Hifni et al., 2025) or conventional PowerPoint for various subjects, but no research has systematically developed media with explicit integration of the three NAI elements specifically designed to improve procedural text writing skills in third grade elementary school. This study offers contributions in three main aspects. First, conceptually, this study introduces the NAI framework as an applicable development of Mayer's multimedia cognitive theory. Second, contextually, this study focuses on procedural text material at the third grade elementary school level which has not been widely explored. Third, methodologically, this study uses a systematic ADDIE development model involving expert validation, field trials, and comprehensive evaluation to ensure the validity, practicality, and effectiveness of the media.

This study aims to develop a valid, practical, and effective interactive PowerPoint-based NAI media to improve the writing skills of third-grade elementary school students. The contribution of this study is both theoretical and practical. Theoretically, this study enriches the study of the application of multimedia cognitive theory in the context of elementary education, particularly through the integration of interactivity as a key design component. Practically, this study produces a learning media product that is ready for use by teachers, as well as providing a development model that can be replicated for other materials or levels of education. The results of this study are expected to be an innovative solution to the problems of learning to write procedural texts while contributing to improving the quality of elementary education in Indonesia.

Method

This study applies a Research and Development (R&D) approach by adapting the ADDIE development model which includes five stages, namely Analysis, Design, Development, Implementation, and Evaluation (Creswell & Plano Clark, 2022; Sugiyono, 2019). This model was chosen because it provides a systematic and structured procedure in producing learning products that are not only technically innovative, but also tested for their feasibility and effectiveness pedagogically. The study was conducted at SDN I Cibanteng, Tasikmalaya Regency, in the 2025/2026 academic year involving 29 third-grade students as participants. The sampling technique used total sampling, because all students in one class were made the research subjects. The class selection was based on the results of a preliminary study which showed that the average ability to write procedural texts was still below the Minimum Completion Criteria (KKM) of 65%.

The analysis phase focused on mapping learning needs, student characteristics, and identifying competency gaps in writing procedural texts. Initial information was collected through observations of classroom learning processes, interviews with teachers, and reviews of student work. This process revealed that some students still had difficulty organizing steps sequentially and using appropriate language structures. Next, in the design phase, the researcher designed learning media based on the NAI (Narrative, Animation, Interactivity) framework in the form of storyboard systematic and

detailed. This design combines audio narration for conceptual explanation, animation to concretely visualize procedural steps, and interactive quizzes with automated feedback to strengthen student understanding and active engagement (Sugiyono, 2023).

The development phase utilized Microsoft PowerPoint as the primary platform, combined with hyperlink features and interactive add-ins to support self-navigation and automatic responses to student responses. The resulting product then underwent a validation process by two subject matter experts and two media experts. The assessment used a four-point Likert scale instrument to measure aspects of content suitability, language, visual appearance, and media interactivity. The media was implemented in real classroom learning using a One Group Pretest-Posttest design. Before using the media, students were given a pretest to measure their initial abilities. After learning using NAI media, students took a posttest to determine improvements in their writing skills. The evaluation phase included data analysis on the validity, practicality, and effectiveness of the media (Miles et al., 2014).

The data collection instruments consisted of expert validation sheets, teacher and student response questionnaires, and procedural text writing tests assessed using a structured rubric with a maximum score of 50. Quantitative data were analyzed through descriptive statistics to determine the level of validity and practicality. Meanwhile, the effectiveness of the media was tested using a paired sample t-test to determine the significance of the improvement in learning outcomes and the Normalized Gain (N-Gain) calculation to measure the improvement category (Creswell, 2015). The study was declared successful if the media reached the Very Valid category ($\geq 81\%$), user responses were in the Very Good category ($\geq 81\%$), and there was a significant increase in the posttest score with a significance value of $p < 0.05$.

Results and Discussion

Validity and Practicality of NAI Media

Table 1
Validity and Practicality of NAI Media

No	Assessment Indicators	Member Score 1	Member Score 2	Rate-rate	Category
1	Visual display quality (color, font, layout)	4	4	4,0	Very Worthy
2	Clarity of animation of procedural steps	4	3	3,5	Very Worthy
3	Navigation button functions and interactivity	4	4	4,0	Very Worthy
4	Audio/narration quality (clear, appropriate volume)	3	4	3,5	Very Worthy
5	Compliance with NAI principles	4	4	4,0	Very Worthy
6	Design consistency between slides	4	4	4,0	Very Worthy
7	Text readability for third grade students	4	3	3,5	Very Worthy
8	Suitability of animation duration to material	3	4	3,5	Very Worthy
9	Quality of images and illustrations	4	4	4,0	Very Worthy
10	Hyperlink function between sections	4	4	4,0	Very Worthy
11	Clarity of media usage instructions	4	3	3,5	Very Worthy
12	Color matching with learning theme	4	4	4,0	Very Worthy

13	Responsiveness of interactive buttons	4	4	4,0	Very Worthy
14	Balance of narrative and visual elements	3	4	3,5	Very Worthy
15	Ease of navigation for elementary school students	4	4	4,0	Very Worthy
16	Slide transition effect quality	4	3	3,5	Very Worthy
17	Conformity of content with KI/KD	4	4	4,0	Very Worthy
18	Clarity of examples of procedural texts	4	4	4,0	Very Worthy
19	Interactive quiz/practice function	4	3	3,5	Very Worthy
20	Overall design and aesthetics of the media	4	4	4,0	Very Worthy
TOTAL	20 indicators	74	73	73,5	90,00%

Based on the results of media expert validation of 20 assessment indicators, a total score of 74 was obtained from Expert 1 and 73 from Expert 2. The overall average reached 73.5, which is equivalent to a feasibility level of 90%. This percentage indicates that in terms of media design and technique, the product developed is included in the category of very suitable for use in learning. This assessment is strengthened by 11 indicators that received a maximum score of 4.0 from both validators. These indicators are mainly related to the quality of attractive and proportional visual displays, well-functioning navigation buttons, consistency of design between slides, and suitability of content with Core Competencies and Basic Competencies (KI/KD). The maximum score on these aspects indicates that the media has been designed systematically and meets good development standards.

Meanwhile, the other nine indicators received an average score of 3.5 and remained in the very appropriate category. The aspects assessed included animation clarity, audio quality, text readability, and the effectiveness of interactive quizzes. Although not all achieved perfect scores, the performance of these indicators was deemed very good and required only minor refinement for further optimization. These validation results confirm that the developed learning media has met the eligibility criteria from the perspective of media experts. Therefore, the product is declared valid and ready for field testing.

Table 2
Comparison of Pretest and Posttest Scores for Writing Procedural Texts (N = 29)

Indicator	Pretest (M ± SD)	Posttest (M ± SD)	t(28)	p	Cohen's d	N-Gain
Text Structure (0-20)	11,2 ± 3,1	17,8 ± 2,4	14,21	<,001	2,45	0,73
Linguistic Rules (0-15)	8,1 ± 2,8	12,4 ± 2,1	9,87	<,001	1,82	0,62
Logical Sequence (0-10)	5,3 ± 2,2	8,9 ± 1,3	11,05	<,001	2,01	0,77
Writing Mechanics (0-5)	3,9 ± 1,4	4,6 ± 0,7	4,12	<,001	0,76	0,64
Total Shoes (0-50)	32,5 ± 6,1	42,7 ± 4,9	12,34	<,001	2,31	0,66

The paired t-test results showed significant improvements in all indicators ($p < .001$). Cohen's d effect sizes ranged from 0.76 (small-medium) to 2.45 (very large), with the total score indicating a large effect ($d = 2.31$). The total N-Gain of 0.66 indicated a relative improvement in the medium-high category. Of the 29 students, 25 students (86.2%) achieved or exceeded the KKM (score ≥ 40) on the posttest, an increase from only 8 students (27.6%) on the pretest. Students who had not yet completed the course ($n = 4$) showed progress on the structure and logic indicators, but still needed assistance on the linguistic rules aspect. The expert evaluation results showed that the developed interactive PowerPoint-based NAI media had a very high level of validity. Material experts gave an

average rating of 92.5% with the criteria Very Appropriate, while media experts gave an average rating of 90.0% with the criteria Very Appropriate. This high validity score indicates that the content of the procedural text presented aligns with the core competencies of the Phase B curriculum, and that the language and structure of the text are accurate. According to Sadiman, expert validity is a critical step before field testing to ensure there are no misconceptions in the material. Expert comments suggested minor improvements to the text color contrast on some slides to improve readability, which were then revised during the development stage.

In terms of practicality, teacher and student responses to the NAI media also showed very positive results. Class teachers gave a response of 88.5% in the Very Practical category, stating that this media is easy to operate and helps with the efficiency of learning time. This is in line with those who stated that the ease of use of technological media by teachers is a key factor in the sustainability of implementation in the classroom. Third grade students gave a response of 86.2% in the Very Good category. They particularly liked the animation feature that shows the sequence of steps for making food and drinks, as well as the interactive quiz feature that provides immediate scores. This high level of student enthusiasm supports the theory (Moreno & Mayer, 2017) that interesting multimedia elements can increase learning motivation without disrupting primary cognitive processing.

Effectiveness of Media on Writing Skills

The media effectiveness test was conducted by comparing the pretest and posttest results of students' ability to write procedural texts. Hypothetical data showed that before the intervention, the average pretest score was 32.5 with a standard deviation of 6.1. This score was still below the established Minimum Completion Criteria (KKM), which was 40. This condition illustrates that in the initial stage, most students had not yet reached the expected level of mastery, both in terms of text structure and language accuracy. After students participated in learning using NAI media for three meetings, there was a quite striking improvement. The average posttest score rose to 42.7 with a standard deviation of 4.9. In addition to experiencing an increase in the average score, the variation in scores between students also tended to shrink, indicating an even distribution of ability improvement. This means that not only certain students experienced progress, but most students showed relatively consistent development.

The results of the statistical analysis using a paired t-test confirmed these findings. The t-value of 12.34 with a significance of $p = 0.000$ ($p < 0.05$) indicated that the difference between the pretest and posttest scores was statistically significant. Thus, the improvement that occurred cannot be considered mere coincidence, but rather the impact of the learning treatment provided. Methodologically, these findings provide an empirical basis that the use of NAI media contributes significantly to improving the ability to write procedural texts. In addition to the t-test, learning effectiveness was also analyzed using the Normalized Gain (N-Gain) calculation. The calculation results showed a value of 0.66 which is included in the medium to high category. This value indicates that NAI media is quite effective in bridging the gap between students' low initial abilities and expected achievements. In other words, this media is able to encourage substantial improvement in a relatively short time, namely in only three meetings.

A more in-depth analysis of each assessment indicator revealed that the most significant improvement occurred in the sequential order and use of imperative verbs. In the pretest, only about 35% of students were able to organize procedural steps logically and systematically. Many writings still skipped, lacked clear cause-and-effect relationships, or presented steps out of sequence. However, after the intervention, this percentage jumped to 85%. This jump indicates that most students understood the importance of sequence in procedural texts. The improvement in sequential order can be attributed to the animation feature in NAI media, which visually displays cause-and-effect relationships. Through this animation, students can concretely see how one step results in a specific consequence, which is then followed by the next. This visual representation helps students build conceptual understanding before expressing it in writing. Thus, students not only memorize the text structure but also truly understand the logic of procedural structure.

In line with Burhan Nurgiyantoro's opinion, one of the main difficulties students face in writing procedural texts lies in their ability to organize a sequence of events in a coherent and coherent manner. Without a solid understanding of logical flow, students tend to arrange steps haphazardly. The dynamic visualizations provided by NAI media serve as a cognitive bridge that helps students internalize this structure before producing the text independently (Nurgiyantoro, 2018).

In addition to the sequence of steps, improvements were also seen in the use of imperative verbs. In the pretest, many students still used declarative sentences or incorrect forms when delivering commands, for example, using "then we..." instead of direct forms like "add..." or "mix...". After media-based learning, the use of imperative forms became more consistent and in accordance with the rules. The audio narration feature in the media provided examples of correct pronunciation of imperative sentences, providing students with language models to emulate. Repeated exposure to appropriate examples helped students develop more accurate language patterns in their writing. Quantitative data and indicator analysis showed that the NAI media not only improved overall scores but also improved fundamental aspects of procedural text writing. The statistically significant improvement, supported by the N-Gain value in the medium-high category, confirmed that this media was effective in improving the quality of learning. These findings demonstrate that the integration of visual and audio features in writing learning can strengthen structural understanding and language accuracy, enabling students to achieve the expected standard of completion.

Integration of Multimedia Theory and Writing Practice

The findings of this study provide strong empirical evidence regarding the effectiveness of the NAI framework in the context of writing instruction in elementary schools. The success of this media can be explained through the lens of the Cognitive Theory of Multimedia Learning (Mayer, 2005). Multimedia principles are fulfilled through a combination of text, images, and audio narration that facilitates information processing through verbal and visual channels simultaneously. This reduces students' cognitive load because they do not need to imagine procedural steps abstractly from written text alone. Animations in NAI media serve as concrete representations of abstract processes, which are highly appropriate for the cognitive developmental stage of third-grade students who are still in the concrete operational stage (Piaget, 2018). The interactivity element in NAI media also plays a crucial role in increasing student engagement. Unlike conventional PowerPoint media, which is one-way, NAI media allows students to click, select, and arrange steps independently. This feature supports the principles of active learning and constructivism, where students construct knowledge through direct experience (Anwar et al., 2024). Interviews with students indicated that they felt more confident because they could repeat parts of the material they did not understand without fear of judgment. Automatic feedback from interactive quizzes provides immediate reinforcement, which according to Skinner (Susiloningtyas & Fitriana Rahayu, 2022) is an important factor in developing positive learning behavior.

These findings are consistent with previous research but offer novel contributions. This study demonstrates the effectiveness of interactive PowerPoint for science and mathematics (Dewi & Manuaba, 2021). This study extends that literature by demonstrating that the same principles can be effectively applied to productive language skills such as writing. While examining NAI media in general, this study specifically operationalizes NAI in the form of a structured storyboard for procedural text (Wulandari & Tanjung, 2021). The combination of narrative for explaining language rules, animation for sequences of steps, and interactivity for writing exercises creates a holistic learning ecosystem. This addresses the challenge identified by (Suharsono & Iqbal, 2025) regarding the need for media that not only enhances motivation but also technical writing skills.

However, there are several limitations that should be acknowledged. First, this study involved only one class of 29 students, so generalizing the results to a wider population should be done with caution. The one-group pretest-posttest design lacked a control group, so external factors such as student maturation may have contributed to the improvement in results. Future research is recommended to use a quasi-experimental design with a control group to more rigorously isolate the media's effects. Second, this media was developed using Microsoft PowerPoint, which, while easily accessible, has limited features compared to specialized authoring tools such as Articulate or Adobe Captivate. However, the choice of PowerPoint is a strength in terms of sustainability, as most elementary school teachers are already familiar with this tool, lowering the barrier to technology adoption (Adibah et al., 2025). The practical implications of this study are significant for elementary education in developing countries. Where access to expensive technology is often limited, interactive PowerPoint-based solutions offer a low-cost, high-impact alternative. Teachers can develop similar media without requiring complex programming training. Furthermore, the focus on procedural texts has high functional relevance for students' daily lives, supporting functional literacy emphasized in modern curricula. The success of achieving the Minimum Competency (KKM) of 80% by the

majority of students (86.2%) indicates that this medium can be a strategic solution to address the problem of low writing skills frequently reported in national studies (Zulela, 2021).

Theoretically, this study strengthens the validity of the NAI framework as an instructional design model. The integration of the three elements (Narrative, Animation, and Interactivity) proved synergistic in improving learning outcomes. Narration without animation may be boring, animation without interactivity may be passive, and interactivity without narrative may be confusing. The combination of the three creates a balanced learning experience. This suggests that learning media developers should not only focus on technological sophistication, but also on how the technology integrates sound pedagogical principles. This study also highlights the importance of rigorous expert validation before implementation, ensuring that visual appeal does not compromise the accuracy of the academic material. The findings of this study provide strong empirical evidence regarding the effectiveness of the NAI framework in the context of writing instruction in elementary schools. The success of this media can be explained through the lens of the Cognitive Theory of Multimedia Learning (McCarthy & Zald, 1977). The principles of multimedia are fulfilled through the combination of text, images, and audio narration, which facilitates information processing through verbal and visual channels simultaneously. This reduces students' cognitive load because they do not need to abstractly imagine procedural steps from written text alone.

Implications of Cognitive Load Theory

In more detail, the effectiveness of NAI media can be analyzed through the Cognitive Load Theory framework, which emphasizes cognitive load management in the learning process. This media has been proven to strategically modify three types of cognitive load, thus optimizing the learning process. First, NAI media reduces extrinsic cognitive load, which arises from the presentation of information that is imprecise or overly complex. This reduction is achieved by simplifying the display, eliminating irrelevant elements, and presenting the material in a segmented form through structured and systematic slides. Thus, students' attention is not divided by visual distractions or information that is not directly related to the learning objectives. Second, this media manages the intrinsic cognitive load, which is naturally quite high in the task of writing procedural texts. The activity of writing procedures requires students to understand the structure, sequence steps logically, and use appropriate language forms simultaneously. This complexity has the potential to burden the working memory capacity of elementary school students. To address this, NAI media provides visual scaffolding in the form of step-by-step animations that help students gradually understand cause-and-effect relationships. This gradual presentation makes complex information easier to process, because students are not forced to understand the entire structure at once.

Third, and most significantly, NAI media increases cognitive load, the mental effort specifically allocated to building and strengthening knowledge schemas. Interactive features that require students to actively sequence steps encourage them to think more deeply. Students not only receive information but also independently process, evaluate, and reconstruct procedural structures. This process strengthens the formation of more stable cognitive schemas. This condition explains why student retention of understanding tends to be longer than in conventional learning, which is predominantly lecture-based and passive. Interactivity in NAI media is also a key factor in increasing learning engagement. Unlike conventional PowerPoint presentations, which tend to be one-way, this media allows students to interact directly with the material through clicking, selecting, and independently arranging steps. This kind of active engagement aligns with the principles of active learning and the constructivist approach, which emphasizes that knowledge is built through direct experience and active student participation. As emphasized by Lev Vygotsky, effective learning occurs when students engage in activities that encourage the interaction between experience, language, and thought structures. Through these interactions, students construct new understanding based on previously held cognitive frameworks (Anwar et al., 2024).

Interviews with students corroborated these findings. Most students stated that they felt more comfortable and confident when using NAI media. The feature that allows for repetition of material gives students the opportunity to learn at their own pace. They can return to specific sections they don't yet understand without feeling afraid or embarrassed in front of their peers. This sense of psychological safety plays a crucial role in building intrinsic motivation and the courage to explore. Furthermore, the presence of automated feedback in interactive quizzes provides immediate

reinforcement for student responses. When students select the correct answer, the system provides positive confirmation; conversely, if an error occurs, students can immediately correct it without having to wait for teacher correction. This principle aligns with the reinforcement theory proposed by B. F. Skinner in Rahayu's discussion, which emphasizes that immediate feedback is a crucial factor in developing effective learning behavior. Consistent reinforcement helps students develop positive study habits and increases persistence in completing assignments (Majid et al., 2018).

Thus, it can be concluded that the success of NAI media lies not only in its technological aspects, but also in its learning design that aligns with the principles of cognitive psychology and modern learning theory. Appropriate cognitive load management, combined with interactivity and direct reinforcement, creates a more meaningful learning experience. Students do not simply understand the material superficially, but build deeper and more durable knowledge structures. This integration of cognitive and constructivist approaches is what makes NAI media effective in improving the quality of learning to write procedural texts in elementary schools.

Class Dynamics and Student Engagement

The results of a qualitative analysis of student behavior during the learning process indicate a striking transformation in classroom dynamics. In conventional learning patterns, interactions tend to be one-way, with the teacher as the center of information and students acting as passive recipients of material. Students generally wait for instructions, take notes, and then complete assignments as directed without much initiative. This situation results in low active participation and limited space for exploring ideas, particularly in writing activities that require creativity and the courage to express ideas. In contrast, the implementation of NAI media brings changes to student engagement patterns. This media facilitates increased student agency, namely the ability and courage of students to take an active role in the learning process. Students no longer simply follow instructions but begin to demonstrate initiative in trying out available features. The learning environment becomes more participatory because the media allows students to experiment independently before presenting their results to the class. The relatively private nature of use, where students can try, edit, and improve their writing on a personal screen, provides a sense of psychological security. This is especially important for students who previously tended to be quiet or lacked confidence.

This change was evident in a group of students who were typically reluctant to speak or present their work. With the support of interactive media, they demonstrated greater courage to try and improve their writing. When mistakes occurred, students were less embarrassed because they could revise their work before presenting it. This process helped build self-confidence and foster a reflective attitude towards the quality of their writing. Thus, media served not only as a technical aid but also as a means of strengthening the affective aspects of learning (Dede, 2009). In terms of classroom management, observations showed a decrease in disruptive behavior of approximately 60% during media-based learning sessions. Behaviors such as talking out of context, playing alone, or not paying attention to the teacher's explanations were significantly reduced. This decrease is thought to be related to the media's consistent visual and interactive stimulation. For elementary school students, who generally have relatively short attention spans, visual variations and hands-on activities can maintain their focus for longer periods than lectures alone.

Adequate visual stimulation also helps reduce boredom. When students engage directly through interactive features, they not only receive information but also process it through action. Activities such as selecting steps, constructing sentences, or correcting text structure make students more cognitively engaged. This engagement contributes to increased concentration and reduces the tendency to seek distractions outside of learning activities. Thus, the classroom atmosphere becomes more conducive and productive. In addition to impacting student behavior, the use of NAI media also changes the teacher's role in the learning process. While previously the teacher served as the primary source of knowledge, now their role has shifted more to that of a facilitator and learning companion. Teachers no longer dominate the delivery of material, but instead direct, motivate, and provide feedback that is more focused on the individual needs of students. This change allows for more personalized interactions, especially for students who experience specific difficulties in composing procedural texts (Schindler et al., 2017).

With less time spent conditioning the classroom for disruptive behavior, teachers have greater opportunities to provide individual guidance. Teachers can approach students who are struggling with

vocabulary, organizing steps coherently, or understanding text structure. This approach supports the principle of differentiated learning, where each student's learning needs are more thoroughly considered. Consequently, students who were previously left behind have greater opportunities to develop according to their capacity. The classroom dynamics created through the use of NAI media demonstrate a shift toward more student-centered learning. Engagement is no longer formal or merely visible, but is reflected in real participation, courage to explore, and deeper cognitive engagement (Tomlinson et al., 2003). This transformation demonstrates that the integration of interactive media into learning not only improves the quality of learning outcomes but also creates a more inclusive, responsive, and adaptive classroom environment to the developmental characteristics of elementary school students.

Contextualization in Indonesian Basic Education

The findings of this study align with those of previous studies and also present a novel element that enriches the research literature on digital-based learning media. Studies conducted by (Dewi & Manuaba, 2021; Indriani et al., 2022) demonstrated that interactive PowerPoint effectively improves learning outcomes in science and mathematics. Both studies confirmed that the integration of visual elements and interactivity can strengthen the understanding of procedural and numerical concepts. This study extends these findings by demonstrating that the same principles can also be effectively applied to productive language skills, specifically writing procedural texts.

The novel contribution of this research lies in the application of the NAI framework in a more structured and contextual manner. Using NAI media in a general context, this study operationalizes the concept in the form of a systematic and directed storyboard for learning procedural texts (Stavroulia & Lanitis, 2023). Each component is designed according to the specific needs of writing skills: narrative focuses on explaining language rules and text structure, animation is used to visualize logical sequences of steps, and interactivity functions as a means of practicing text composition. The integration of these three elements creates a learning ecosystem that is not only visually appealing but also supports the gradual development of technical skills.

This approach also addresses the identified challenge of the need for learning media that not only enhances learning motivation but also concretely develops technical writing skills (Suharsono & Iqbal, 2025). Many digital media successfully create a pleasant learning environment, but they do not necessarily have a significant impact on mastery of language structure and the ability to organize ideas. Through integrated design, NAI media in this study demonstrates that visual appeal can go hand in hand with strengthening academic competencies. In the context of national education policy, the development of NAI media has strategic relevance to the implementation of the Merdeka Belajar policy. The Merdeka Curriculum emphasizes student-centered, flexible, and adaptive learning to individual needs. NAI media supports this principle by enabling students to learn at their own pace (self-paced learning). The repetition feature and interactive exercises provide room for differentiation, so students who need more time can still understand the material without pressure. This aligns with the spirit of learning that respects the diversity of student abilities.

Furthermore, the use of Microsoft PowerPoint as the basic platform makes this media relatively low-cost and easy to replicate. Teachers do not need to master complex or expensive software to develop similar media. In the context of Indonesia, which experiences disparities in technological infrastructure between regions, this approach is a realistic solution. Schools in areas with limited facilities can still adopt this model as long as they have a simple computer and projector. Thus, NAI media has the potential to reduce the digital divide, which often hinders the implementation of educational technology in elementary schools, particularly in rural areas. Several limitations of this study need to be openly acknowledged. First, this study only involved one class of 29 students. The relatively small sample size limits the generalizability of the findings to a broader population. Student characteristics, social backgrounds, and specific school contexts may influence the results. Therefore, interpretation of the results requires caution and should not be generalized to all elementary schools in Indonesia (Sahmeni & Afifah, 2019).

Second, the research design used was a one-group pretest-posttest without a control group. The absence of a comparison group means that the possibility of external factors, such as student maturation or other learning experiences outside the intervention, cannot be completely eliminated. To obtain stronger evidence regarding the effectiveness of the media, further research is recommended using a quasi-experimental design with a control group. This approach allows researchers to more rigorously

isolate the media's influence and enhance the study's internal validity. Third, Microsoft PowerPoint-based media development has limited features compared to professional authoring tools such as Articulate or Adobe Captivate. PowerPoint's animation and interactivity features are not as complex as those of specialized e-learning development software. However, this limitation also serves as a strength in terms of sustainability and technology adoption. As Zahara and Jupri noted, teachers' familiarity with a technology significantly influences the success of its implementation (Adibah et al., 2025). Because most elementary school teachers are already familiar with PowerPoint, the barriers to adoption are lower and the chances of continued use of the media are increased. This research not only confirms the effectiveness of interactive media in improving learning outcomes but also offers a contextual, adaptive, and realistic model for implementation in various school settings. The integration of theory, practice, and educational policy makes NAI media a potential innovative alternative to support learning transformation in Indonesian elementary schools.

Theoretical and Practical Implications

Conceptually, the findings of this study reinforce the validity of the NAI framework as an instructional design model relevant to contemporary learning needs. This framework demonstrates that the integration of Narrative, Animation, and Interactivity elements is not simply a combination of technological features, but rather a complementary pedagogical unity. These three elements work synergistically to create an effective, meaningful, and student-centered learning experience. When one element stands alone without the support of the others, learning effectiveness tends to decline. Narratives presented without animation have the potential to be monotonous and difficult to understand, animation without interactivity risks making students merely passive spectators, while interactivity without a clear narrative can lead to conceptual confusion. The combination of these three within the NAI framework creates a balance between information delivery, conceptual understanding, and active student engagement. Narrative serves as a cognitive guide that helps students understand the context and objectives of learning. Animation reinforces narrative with concrete visual representations, making abstract concepts easier to grasp. Meanwhile, interactivity encourages students to actively engage in the learning process, processing information deeply, and building understanding through direct experience. This synergy creates a learning flow that is not only informative, but also participatory and reflective.

These findings have important implications for the development of learning media. Media developers should not be caught up in merely technological sophistication, such as excessive visual effects or complex but meaningless interactive features. Instead, the primary focus should be on how the technology can integrate solid pedagogical principles based on learning theory. Effective learning media is designed with students' learning styles in mind, not simply what the technology can do. Therefore, instructional design must be based on learning objectives, student characteristics, and theoretically proven learning principles. Furthermore, this study emphasizes the importance of a rigorous expert validation process before media is widely implemented. This validation is necessary to ensure that engaging visuals and innovative interactive features do not compromise conceptual accuracy, material depth, or curriculum alignment. The involvement of subject matter and media experts is crucial for maintaining a balance between visual appeal and academic accuracy. Without an adequate validation process, learning media risks becoming merely a means of entertainment that makes little significant contribution to achieving learning objectives.

From a practical perspective, the implications of this research encourage elementary school teachers to begin to move away from their reliance on static, one-way presentation media. Such media tend to limit students to passive recipients of information. Conversely, the use of interactive media such as the NAI model opens opportunities for students to engage cognitively, explore, and construct understanding independently. Teachers act as facilitators who guide the learning process, no longer the sole source of knowledge in the classroom. However, this shift requires strengthening teacher competencies. Teacher training programs should emphasize not only the technical aspects of using devices or applications, but also pedagogical skills in designing learning materials that align with multimedia learning principles. Teachers need to be equipped with an understanding of how to combine text, visuals, audio, and interactive activities proportionally to avoid cognitive overload. With this knowledge, teachers can utilize technology more effectively and contextually according to learning needs.

At the institutional level, schools and education offices are expected to provide adequate supporting

infrastructure. The availability of suitable projectors, functioning computer equipment, and access to electricity and adequate classrooms are essential prerequisites for the implementation of interactive media. However, this research demonstrates that improving learning quality does not always have to rely on expensive software or sophisticated technology. The NAI model developed based on PowerPoint demonstrates that even relatively simple media can be effective when designed with the right pedagogical approach. The NAI model has the potential to serve as a blueprint for developing learning media in other subjects. Subjects such as science and social studies, which often involve processes, abstract concepts, and cause-and-effect relationships, benefit greatly from visualization and interactivity. With adjustments to content and context, the NAI framework can be replicated to help students understand natural phenomena, social processes, and complex scientific concepts. This opens up opportunities for the development of learning media that are broader, more adaptive, and more relevant to the needs of 21st-century learning.

This research confirms that the success of learning media lies not in the technology itself, but rather in instructional design that integrates pedagogical principles, student needs, and the learning context. The NAI framework offers a balanced approach between narrative, visualization, and interactivity, thereby improving learning outcomes and the quality of students' learning experiences. These findings provide significant theoretical and practical contributions to the development of learning media in elementary schools and have the potential for broader application across various educational contexts.

Conclusion

Learning media based on the NAI framework (Narrative, Animation, Interactivity) developed through interactive Microsoft PowerPoint has been proven to meet the criteria of validity, practicality, and effectiveness in improving the writing skills of procedural texts of third-grade elementary school students. The high level of validity indicates that the material, visual design, and interactive features of the media are in accordance with the demands of the curriculum, student characteristics, and the principles of language learning in elementary education. Positive responses from teachers and students further confirm that this media is easy to use, interesting, and supports the learning process optimally. Empirically, the effectiveness of the media is demonstrated by a significant increase in student learning outcomes scores between the pretest and posttest, as well as learning mastery achievements that exceed the Minimum Mastery Criteria (KKM). This success is inseparable from the media's ability to visualize the structure of procedural texts from being previously abstract to becoming more concrete and systematic. The integration of audio narration helps clarify verbal explanations, animation strengthens the representation of procedural steps, while interactive features such as quizzes and automatic feedback encourage active student involvement in the learning process. Thus, this media indirectly applies the principles of multimedia cognitive theory that can reduce cognitive load and improve information retention.

Although this study is limited by its relatively small sample size and reliance on the availability of technological devices, the findings still provide significant contributions. This research enriches the study of language learning media development, particularly in the context of using the NAI framework for procedural text writing skills in elementary schools. Furthermore, the research findings offer a practical and low-cost solution that can be adapted by teachers in various regions, particularly in Indonesia and developing countries with limited technological resources. Thus, the integration of simple yet pedagogically grounded technology is a strategic alternative for improving the quality of language learning at the elementary level.

References

- Adibah, I. Z., Muyasaroh, M., Adnan, M., D. Rimbe, A., & Ismail, D. (2025). Inclusive Pedagogical Strategies of Islamic Religious Education Teachers in Instilling Multicultural Values Among Students. *Scaffolding: Jurnal Pendidikan Islam Dan Multikulturalisme*, 7(3), 156–173. <https://doi.org/10.37680/scaffolding.v7i3.7842>
- Anwar, M. N., Mushtaq, N., Mubeen, A., & Iqbal, M. (2024). The Power of ZPD: Enhancing Teaching and Learning. *Journal of Education and Social Studies*, 5(2), 396–405. <https://doi.org/10.52223/jess.2024.5220>

- Anyan, A., Ege, B., & Faisal, H. (2020). Pengembangan Media Pembelajaran Interaktif Berbasis Microsoft Power Point [Development of Interactive Learning Media Based on Microsoft Power Point]. *JUTECH: Journal Education and Technology*, 1(1), 289–304. <https://doi.org/10.31932/jutech.v1i1.690> [In Indonesian]
- Creswell, J. W. (2015). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (5th ed.). Pearson.
- Creswell, J. W., & Plano Clark, V. L. (2022). *Designing and Conducting Mixed Methods Research* (3rd ed.). SAGE Publications.
- Dede, C. (2009). Immersive Interfaces for Engagement and Learning. *Science*, 323(5910), 66–69. <https://doi.org/10.1126/science.1167311>
- Dewi, K. A., & Manuaba, I. M. (2021). Pengembangan media pembelajaran PowerPoint interaktif pada mata pelajaran IPA siswa kelas VI SD [Development of interactive PowerPoint learning media for science subjects for sixth grade elementary school students]. In *Jurnal Pendidikan Dasar Indonesia* (Vol. 12, Issue 3, pp. 201–215).
- Graham, S., Harris, K. R., & Chambers, A. B. (2018). Evidence-based practice and writing instruction: A review of reviews. In S. Graham, C. A. MacArthur, & J. Fitzgerald (Eds.), *Handbook of writing research* (2nd ed., pp. 211–226). The Guilford Press.
- Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (2020). *Instructional media and technologies for learning* (12th ed.). Pearson.
- Hifni, A. M., Ramadhani, A., Septiana, A. S. N. F., & Rahmawati, L. (2025). *Psikologi Spiritualitas: Membandingkan Islam dan Kepercayaan Dunia [Psychology of Spirituality: Comparing Islam and World Beliefs]*. Penerbit: Kramantara JS.
- Indriani, N. M. P. S., Dewi, N. K., & Erfan, M. (2022). Pengembangan Media Pembelajaran Power Point Interaktif Materi Bangun Datar Siswa Kelas III SD Negeri 1 Cakranegara [Development of Interactive Power Point Learning Media for Plane Shape Material for Grade III Students of SD Negeri 1 Cakranegara]. *Jurnal Ilmiah Profesi Pendidikan*, 7(2b), 516–520. <https://doi.org/10.29303/jipp.v7i2b.548> [In Indonesian]
- Majid, A. A., Othman, N., & Ismail, S. R. (2018). Penerapan Contact Theory dalam Model dan Aktiviti SCL untuk Kursus Hubungan Etnik di Universiti Putra Malaysia: The Incorporation of Contact Theory in SCL Models and Activities for Ethnic Relations Course in Universiti Putra Malaysia. *The Sultan Alauddin Sulaiman Shah Journal (JSASS)*, 5(2), 207–224.
- Mayer, R. E. (2005). Cognitive theory of multimedia learning. *The Cambridge Handbook of Multimedia Learning*, 41(1), 31–48.
- Mayer, R. E. (2009). *Multimedia learning*. Cambridge University Press.
- Mayer, R. E. (2014). Research-based principles for designing multimedia instruction. In V. A. Benassi, C. E. Overson, & C. M. Hakala (Eds.), *Applying science of learning in education: Infusing psychological science into the curriculum* (pp. 59–70). Society for the Teaching of Psychology.
- McCarthy, J. D., & Zald, M. N. (1977). Resource mobilization and social movements: A partial theory. *American Journal of Sociology*, 82(6), 1212–1241.
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative Data Analysis: A Methods Sourcebook* (3rd ed.). SAGE Publications.
- Moreno, R., & Mayer, R. E. (2017). Interactive multimodal learning environments. *Educational Psychology Review*, 29(3), 467–488. <https://doi.org/10.1007/s10648-017-9408-0>
- Nurgiyantoro, B. (2018). Penilaian pembelajaran bahasa berbasis kompetensi (Edisi Revisi) [Competency-based language learning assessment (Revised Edition)]. In *BPFE Yogyakarta*.
- Nurkhodri, M., & Dafit, F. (2022). Analisis kesulitan menulis teks prosedur pada siswa kelas IV SD Negeri 1 Kota Bengkulu [Analysis of difficulties in writing procedural texts in grade IV students

- of SD Negeri 1 Kota Bengkulu]. *Jurnal Pendidikan Dan Konseling*, 4(5), 1345–1353.
- Paivio, A. (2020). *Mental representations: A dual coding approach* (2nd ed.). Oxford University Press.
- Piaget, J. (2018). *The construction of reality in the child*. Routledge.
- Sahmeni, E., & Afifah, N. (2019). Using Critical Discourse Analysis (CDA) in Media Discourse Studies: Unmask the Mass Media. *REiLA : Journal of Research and Innovation in Language*, 1(2), 39–45. <https://doi.org/10.31849/reila.v1i2.2764>
- Santrock, J. W. (2019). *Educational psychology* (7th ed.). McGraw-Hill Education.
- Schindler, L. A., Burkholder, G. J., Morad, O. A., & Marsh, C. (2017). Computer-based technology and student engagement: a critical review of the literature. *International Journal of Educational Technology in Higher Education*, 14, 1–28.
- Smaldino, S. E., Lowther, D. L., & Mims, C. (2019). *Instructional technology and media for learning*(1). Pearson.
- Stavroulia, K. E., & Lanitis, A. (2023). The role of perspective-taking on empowering the empathetic behavior of educators in VR-based training sessions: An experimental evaluation. *Computers & Education*, 197(2), 104739. <https://doi.org/10.1016/j.compedu.2023.104739>
- Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D [Quantitative, Qualitative, and R&D Research Methods]*. Alfabet.
- Sugiyono. (2023). *Metode Penelitian Kuantitatif [Quantitative Research Methods]*. Kualitatif dan R&D. Alfabeta.
- Suharsono, & Iqbal, M. (2025). Pengaruh Media Power Point Interaktif Terhadap Peningkatan Hasil Belajar Pendidikan Agama Islam [The Influence of Interactive Power Point Media on Improving Learning Outcomes in Islamic Religious Education]. *Jurnal Pendidikan Islam*, 11(2), 11–15. <https://doi.org/10.37286/ojs.v11i2.284> [In Indonesian]
- Susiloningtyas, I., & Fitriana Rahayu, E. (2022). Hubungan Stress dengan Gangguan Menstruasi pada Remaja Putri [The Relationship Between Stress and Menstrual Disorders in Adolescent Girls]. *Jurnal Sehat Masada*, 16(1), 34–39. <https://doi.org/10.38037/jsm.v16i1.261> [In Indonesian]
- Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T. R., Brimijoin, K., Conover, L. A., & Reynolds, T. (2003). Differentiating Instruction in Response to Student Readiness, Interest, and Learning Profile in Academically Diverse Classrooms: A Review of Literature. *Journal for the Education of the Gifted*, 27(2–3), 119–145. <https://doi.org/10.1177/016235320302700203>
- Wulandari, D. P., & Tanjung, A. (2021). Peran Model Pembelajaran Aktif dalam Penguatan Pendidikan Karakter di Sekolah Dasar [The Role of Active Learning Models in Strengthening Character Education in Elementary Schools]. *Jurnal Pendidikan Karakter*, 11(3), 211–220. <https://doi.org/10.5678/jpk.v11i3.204V>[In Indonesian]
- Zulela, M. S. (2021). *Pembelajaran bahasa Indonesia di sekolah dasar [Indonesian language learning in elementary schools]*. Prenadamedia Group.



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