

COMIC MEDIA IN DEEP LEARNING TO IMPROVE ELEMENTARY STUDENTS' UNDERSTANDING OF PANCASILA VALUES

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ABSTRACT

Students' understanding of Pancasila values may remain superficial when classroom learning relies primarily on lectures and textbooks. This study examined the effect of comic media integrated with a deep learning approach on Grade V students' understanding of Pancasila values. A quantitative quasi-experimental method with a non-equivalent control-group pretest-posttest design involved 40 students, with 20 students in an experimental group and 20 in a control group. The experimental group learned through comic media integrated with meaningful, mindful, and joyful learning activities, whereas the control group received lecture- and textbook-based instruction. Data were collected through achievement tests, classroom observations, and documentation and analyzed using descriptive statistics, the Shapiro-Wilk test, Levene's test, paired-samples t tests, an independent-samples t test, and N-Gain. The experimental and control groups had mean pretest scores of 59.75 and 55.00 and posttest means of 82.75 and 65.00, respectively. Both groups improved significantly, while the experimental group outperformed the control group on the posttest, $t(38) = 7.421$, $p < .001$, mean difference = 17.75, 95% CI [12.91, 22.59], with an estimated Cohen's $d = 2.35$. N-Gain was moderate in the experimental group (0.5801) and low in the control group (0.2218). The findings support comic media integrated with deep learning as a promising strategy for strengthening cognitive understanding of Pancasila values in the studied context.

Keywords: Comic media, Deep learning approach, Elementary education, Pancasila values

INTRODUCTION

Pancasila education has a strategic role in elementary education because it introduces foundational values related to civic identity, social responsibility, coexistence, and everyday decision-making. At this level, learning should move beyond recalling the five principles toward understanding how values are interpreted and applied in concrete situations. This orientation is consistent with broader scholarship on citizenship education, which emphasizes opportunities for dialogue, student participation, inquiry, and the discussion of public or value-laden issues rather than purely transmissive instruction (Schuitema et al., 2018; Siegel-Stechler, 2021). In the Indonesian elementary context, teachers also play a central role in designing learning experiences that connect character-related values with students' social and developmental needs (Alkhasanah et al., 2023).

The practical problem addressed in this study emerged from classroom learning at SD Negeri Seilale. Initial observations on December 12, 2025, indicated that students could generally memorize Pancasila texts, yet their understanding of the meaning and contextual application of the values was less consistent. Learning was still dominated by oral explanation and textbooks, while opportunities for students to discuss, reflect, interpret value-related situations, and connect ideas with their own experiences were limited. Such a pattern creates a gap between the intended meaning-oriented character of Pancasila education and classroom practices that primarily reward recall. The present study therefore focuses on an instructional intervention intended to make Pancasila values more concrete, discussable, and cognitively meaningful.

The need for concrete representation is particularly relevant for elementary learners. Visual and verbal representations can complement one another when they are coherently designed and directly related to the learning task. A meta-meta-analysis of multimedia learning research concluded that multimedia design can improve learning, but the benefit depends strongly on

how verbal and visual information is selected, organized, and integrated (Noetel et al., 2022). A meta-analysis of graphics and reading comprehension similarly found that graphics can support comprehension when they contribute relevant representational information rather than functioning as decoration (Guo et al., 2020). More recent synthesis work also distinguishes representational and organizational pictures from decorative images, reinforcing the importance of the instructional function of visuals (Schewior & Lindner, 2024).

Comics are a distinctive multimodal form because meaning is constructed across words, images, panels, characters, and sequential events. Understanding a comic therefore involves more than looking at pictures; readers integrate visual and linguistic cues across a narrative sequence (Cohn, 2020). In educational settings, this combination can provide a contextual structure for unfamiliar or abstract ideas. Research has reported positive learning or engagement outcomes from comics in science education (Hosler & Boomer, 2011), critical-thinking-oriented classroom use (Krusemark, 2017), mathematics education (Toh et al., 2017), and geography learning (von Reumont & Budke, 2021). These studies suggest that comics can function as pedagogical representations when their narratives and instructional prompts are aligned with the intended learning outcomes.

Evidence involving younger learners is especially relevant to the present study. Research with primary students has identified humour, story narrative, visuals, and scaffolded questions as features that may support enjoyment, understanding, real-world connections, and participation during comic-based instruction (Tay et al., 2024). A comic-anchored cryptology and cybersecurity curriculum also showed how relatable characters and narrative context can situate unfamiliar STEM content for upper-elementary learners (Wusylko et al., 2024). In environmental education, argumentation-supported educational comics were associated with stronger interest, motivation, and academic achievement among fifth-grade students than conventional instruction (Şentürk & Selvi, 2024). More recently, Grade 4-6 students reported drawing on a comic's narrative and imagery when making meaning of evolutionary concepts (Aringer et al., 2025).

At the same time, visual or narrative presentation should not be assumed to improve learning automatically. Experimental evidence with fifth graders has shown that simply adding narrative passages or representational pictures to expository science text does not necessarily produce higher comprehension or problem-solving performance (Kakimova et al., 2026). Experimental work on comic presentation formats has likewise shown that learning benefits can vary by content and by design features (Walsh et al., 2024). These findings are important because they shift attention from the question of whether comics are inherently effective to the more educationally relevant question of how comics are integrated with purposeful cognitive activity, scaffolding, discussion, and reflection.

In the Indonesian context, recent studies have developed or evaluated comics for elementary learning and Pancasila-related content. Comic-based materials have been developed to support critical thinking (Rahman & Anas, 2024), represent Bhinneka Tunggal Ika and Pancasila through digital narratives (Nurfauzi et al., 2024), and support Grade IV Pancasila education (Reinita & Sarki, 2025). Earlier elementary applications also illustrate the broader use of comic media as an instructional representation (Nugraheni, 2017). Taken together, these studies show a growing instructional basis for comics, while leaving room to investigate how comic media can be integrated with a learning approach specifically designed to promote deeper conceptual processing.

In this study, deep learning refers to a pedagogical orientation toward fuller conceptual understanding rather than to machine learning or artificial intelligence. The intervention emphasizes meaningful learning, mindful learning, and joyful learning. Meaningful learning connects new content with prior knowledge and real-life experience; mindful learning requires

conscious attention, active participation, and reflection; and joyful learning seeks an engaging learning atmosphere that sustains participation. Emerging Indonesian scholarship has discussed this orientation in PPKn and Pancasila-related character education (Amalia, 2025; Do et al., 2025). The emphasis on active cognitive processing is also compatible with international evidence that generative activity can improve learning when learners do more than passively receive textual information (Schindler & Richter, 2023).

The integration of comics with deep learning is therefore conceptually stronger than the use of comics as decorative media. Visual narratives can support meaningful learning by situating Pancasila values in recognizable events; teacher questions and peer discussion can support mindful learning by requiring students to identify values, justify interpretations, compare possible actions, and reflect on consequences; and the visual-narrative form can contribute to joyful participation. This integration is also consistent with citizenship-education research showing that structured discussion and student-centered practices can create richer opportunities for civic learning (Schuitema et al., 2018; Siegel-Stechler, 2021). The intended mechanism is consequently the interaction between representation and guided cognitive activity, not visual attractiveness alone.

The research gap can be stated more precisely. Existing studies in the literature used in this manuscript address comic development, digital comics, argumentation-supported comics, comics in several school subjects, or deep-learning-oriented Pancasila education, but the available literature does not identify a prior quasi-experimental study that specifically tests comic media integrated with a deep learning approach for Grade V students' understanding of Pancasila values. The novelty of this study is therefore instructional and contextual: it evaluates a structured integration of visual narrative media with meaningful, mindful, and joyful learning principles, rather than presenting comic media as a standalone innovation. Based on this gap, the study aimed to determine students' initial understanding of Pancasila values and to examine whether students taught through the integrated intervention achieved stronger cognitive learning outcomes than students who received conventional lecture- and textbook-based instruction.

METHOD

This study employed a quantitative quasi-experimental design using a non-equivalent control-group pretest-posttest structure. A quasi-experimental design was appropriate because the study was conducted in an established school context in which complete random assignment of students was not feasible. The design enabled the study to compare change within each group and post-intervention performance between the experimental and control groups. The independent variable was comic media integrated with a deep learning approach, while the dependent variable was students' understanding of Pancasila values.

The study involved Grade V students at SD Negeri Seilale, Ambon City, Maluku Province. The population comprised 40 students, and total sampling was used so that all members of the population participated. The statistical output in the study record shows 20 students in the experimental group and 20 in the control group. All students completed a pretest before instruction. Grouping was undertaken by considering equality of initial ability, but the design remained nonrandomized and is therefore interpreted as a nonequivalent-group comparison. The experimental group's pretest mean was 59.75 and the control group's pretest mean was 55.00.

The outcome construct was students' understanding of Pancasila values. It was operationalized through the ability to explain the meaning of important Pancasila principles, identify their application in everyday situations, analyze problems related to Pancasila values, and select attitudes consistent with those values. Data collection used an achievement test, an

observation sheet, and documentation. The achievement test was a multiple-choice instrument administered before and after instruction. Observation was used to document learning activities and student participation, while documentation included supporting evidence such as attendance records, photographs of learning activities, and student work.

Before use, the achievement instrument was reported to have undergone expert content validation and reliability testing. However, the study record available for this revision does not specify the number of test items, the number or qualifications of validators, the validity index or decision rule, or the reliability coefficient

The experimental group learned through comic media integrated with the deep learning approach. The comic presented contextual visual narratives related to Pancasila values. Learning activities were organized so that students encountered a situation represented in the comic, identified the value-related issue, discussed the meaning of the relevant principle, connected the event with everyday experiences, compared possible responses, and reflected on value-consistent action. This sequence operationalized meaningful learning through contextual connection, mindful learning through attention, explanation and reflection, and joyful learning through an engaging visual-narrative format. The control group received conventional oral explanation and textbook-based instruction. Both groups completed the same pretest-posttest outcome structure.

The exact number and duration of instructional sessions, detailed lesson-by-lesson topics, and the division of teaching roles between the classroom teacher and researcher were not specified in the study record available for this revision.

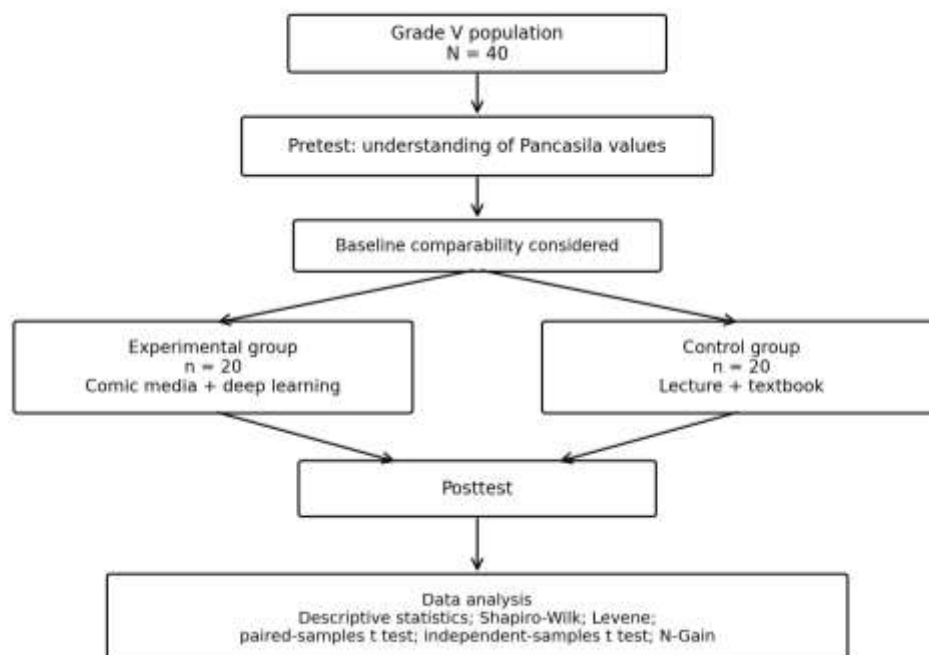


Figure 1. Quasi-experimental research procedure

The procedure comprised planning, implementation, and final analysis stages. During planning, learning materials and instruments were prepared and instrument feasibility was checked. During implementation, both groups completed the pretest; the experimental group then received comic-media learning integrated with the deep learning approach, while the control group continued with conventional lecture- and textbook-based learning. After the instructional sequence, both groups completed the posttest. The final stage consisted of data

processing, statistical analysis, interpretation, and conclusion drawing. Figure 1 summarizes the study procedure.

Descriptive statistics were used to summarize group performance. The Shapiro-Wilk test was used to evaluate normality, and Levene's test was used to evaluate equality of variance. Within-group pretest-posttest changes were examined with paired-samples *t* tests. The principal between-group posttest comparison used an independent-samples *t* test. N-Gain was calculated to describe normalized improvement. To strengthen interpretation of the between-group difference, an estimated Cohen's *d* was derived from the reported independent-samples *t* statistic and equal group sizes using $d = t\sqrt{(1/n_1 + 1/n_2)}$. Statistical significance was evaluated at $p < .05$.

The study record available for this revision does not state an institutional ethics approval number or provide a complete account of school authorization, parent/guardian consent, student assent, confidentiality procedures, and governance of classroom photographs. Because the participants were elementary-school students, these procedures should be reported explicitly.

RESULTS AND DISCUSSION

The analysis examined baseline performance and statistical assumptions, followed by within-group change, between-group posttest differences, and normalized gain. The results are presented in cleaned tables rather than raw statistical-software output so that the statistical evidence can be interpreted directly.

Baseline Performance and Assumption Testing

Table 1. Descriptive Pretest and Posttest Means

Group	n	Pretest Mean	Posttest Mean	Raw Mean Gain
Experimental	20	59.75	82.75	23.00
Control	20	55.00	65.00	10.00

The descriptive results indicate that both groups began with relatively modest pretest performance. The experimental group's mean was 59.75 and the control group's mean was 55.00. After instruction, the experimental mean increased to 82.75, whereas the control mean increased to 65.00. The experimental posttest mean of 82.75 is used consistently because it is supported by the reported independent-samples output: a mean difference of 17.75 combined with a control mean of 65.00 yields an experimental mean of 82.75. This corrects the inconsistent value that appeared in an earlier version of the abstract.

Table 2. Assumption-Test Results

Test / Variable	Statistic	df	p
Shapiro-Wilk: Experimental pretest	.948	20	.336
Shapiro-Wilk: Control pretest	.933	20	.173
Shapiro-Wilk: Experimental posttest	.929	20	.146
Shapiro-Wilk: Control posttest	.912	20	.069
Levene: Posttest variances	F = .358	1, 38	.553

The assumption tests supported the use of the reported parametric analyses. Shapiro-Wilk significance values exceeded .05 for the experimental pretest (.336), control pretest (.173), experimental posttest (.146), and control posttest (.069). Levene's test for the posttest comparison was also nonsignificant, $F = 0.358$, $p = .553$, supporting the equal-variance

assumption for the independent-samples *t* test. These assumption checks support the reported analyses, although they do not remove threats to internal validity arising from the nonrandomized group design.

Within-Group and Between-Group Effects

Table 3. Paired-Samples *t*-Test Results

Group	Mean diff.*	SD diff.	<i>t</i> (df)	<i>p</i>	95% CI
Experimental	-23.00	6.767	-15.201 (19)	< .001	[-26.167, -19.833]
Control	-10.00	4.292	-10.420 (19)	< .001	[-12.009, -7.991]

Within both groups, posttest performance was significantly higher than pretest performance. For the experimental group, the mean pretest-posttest difference was -23.00 when calculated as pretest minus posttest, $t(19) = -15.201$, $p < .001$, 95% CI [-26.167, -19.833]. For the control group, the corresponding mean difference was -10.00, $t(19) = -10.420$, $p < .001$, 95% CI [-12.009, -7.991]. The control-group improvement is plausible because conventional teaching can still support learning through additional exposure and practice. The key evaluative question is whether the integrated comic-and-deep-learning condition produced a larger outcome than the comparison condition.

Table 4. Independent-Samples *t*-Test for Posttest Scores

Comparison	<i>t</i> (df)	<i>p</i>	Mean Difference	95% CI	Cohen's <i>d</i>
Experimental vs. Control	7.421 (38)	< .001	17.75	[12.91, 22.59]	2.35

The posttest between-group comparison yielded $t(38) = 7.421$, $p < .001$, with a mean difference of 17.75 points and a 95% confidence interval of approximately [12.91, 22.59]. Based on the reported *t* statistic and equal group sizes of 20, the estimated Cohen's *d* was approximately 2.35, indicating a very large standardized difference within this sample. This estimate should be interpreted cautiously because small, single-site, nonrandomized studies can produce effect-size estimates that may not replicate at the same magnitude in other classrooms or schools.

Normalized Gain

Table 5. N-Gain Results

Group	Mean N-Gain	<i>n</i>	SD	Category
Experimental	0.5801	20	0.07107	Moderate
Control	0.2218	20	0.08147	Low
Total	0.4009	40	0.19651	-

The N-Gain results reinforced the same pattern. The experimental group achieved a mean N-Gain of 0.5801 (SD = 0.07107), categorized as moderate, whereas the control group achieved 0.2218 (SD = 0.08147), categorized as low. The experimental group therefore demonstrated both a higher posttest mean and stronger normalized improvement. The agreement between the independent-samples comparison and the N-Gain analysis provides internally coherent evidence that the experimental condition was associated with stronger cognitive learning in this sample.

Discussion, Contribution, and Practical Significance

The findings are consistent with a growing body of research suggesting that educational comics can support conceptual learning when they provide an interpretable narrative context

and are integrated with instructional activity. In fifth-grade environmental education, argumentation-supported comics were associated with improvements in achievement, interest, and motivation (Şentürk & Selvi, 2024). Primary-school students have also reported that story narrative, visuals, humour, and scaffolded questions can support understanding, participation, and connections with real-world applications (Tay et al., 2024). In upper-elementary informal learning, a comic-based macrocontext helped students engage with unfamiliar cryptology and cybersecurity content (Wusylko et al., 2024). These studies are particularly relevant because they involve younger learners and emphasize the relationship between the comic and the surrounding instructional design.

The present findings also align with evidence from science-comic research. Hosler and Boomer (2011) found that a science comic could support content learning and attitudes, particularly among learners who began with lower knowledge. More recent work with students in Grades 4-6 showed that learners drew on a comic's narrative and imagery when explaining what they had learned about evolution (Aringer et al., 2025). Across other educational contexts, comic-based instruction has been linked with critical-thinking-oriented learning (Krusemark, 2017), spatial reasoning and representation (von Reumont & Budke, 2021), and opportunities to develop broader competencies through structured tasks (Toh et al., 2017). The cross-domain evidence does not establish that all comics are effective, but it supports the plausibility of comics as learning tools when content and pedagogy are aligned.

One mechanism that may explain the stronger experimental outcome is the integration of verbal and visual information. Multimedia-learning evidence indicates that learners can benefit from coherent combinations of words and pictures, especially when each representation contributes functionally to understanding (Noetel et al., 2022). The meta-analysis by Guo et al. (2020) similarly supports the potential of relevant graphics to improve reading comprehension, while Schewior and Lindner (2024) emphasize that representational and organizational pictures differ educationally from merely decorative images. In the present intervention, comic panels were not used simply to make the lesson visually attractive; they represented value-laden situations that students could interpret, discuss, and connect with real experiences.

Visual narrative theory further clarifies why sequential comics may be useful for Pancasila learning. Comics require readers to integrate information across panels, infer relationships between events, and connect visual and linguistic cues into a coherent representation (Cohn, 2020). A story involving cooperation, fairness, tolerance, deliberation, or responsibility can therefore externalize a value-related problem in a form that students can inspect and discuss. In this sense, the comic functions as a mediating artifact rather than as a substitute for teaching. This interpretation is compatible with Vygotsky's (1978) view that tools, language, and social interaction can mediate conceptual development.

The deep-learning component is also important because the intervention was intended to transform the comic from a reading object into a stimulus for cognitive activity. Meaningful learning was supported when students connected a depicted situation with familiar school, family, or community experience. Mindful learning was supported when students were asked to identify the value at stake, justify a judgment, compare alternatives, and reflect on consequences. Joyful learning was supported by the accessible visual-narrative form and opportunities for active participation. This instructional logic corresponds with Indonesian discussions of deep learning in PPKn and Pancasila-related education (Amalia, 2025; Do et al., 2025) and with broader evidence that generative activity improves learning when learners actively produce, explain, or reorganize meaning rather than only rereading information (Schindler & Richter, 2023).

The results should nevertheless be interpreted in light of evidence showing that narrative and visual formats do not automatically improve achievement. Kakimova et al. (2026) found

no general comprehension advantage from simply adding narrative passages or representational pictures to fifth-grade science text, and Walsh et al. (2024) reported that the effects of comic presentation formats varied across the types of procedural information being learned. These findings strengthen, rather than weaken, the interpretation of the present study: the relevant pedagogical factor may be the integration of representation, scaffolding, discussion, reflection, and task alignment. A comic that is visually appealing but instructionally peripheral may not produce the same outcome as a comic that structures how students think about the target concept.

The civic and Pancasila context also requires attention to interaction rather than media alone. Research on democratic citizenship education has long emphasized classroom discussion as an important setting for students to articulate judgments, encounter alternative perspectives, and develop the quality of their reasoning (Schuitema et al., 2018). Student-centered practices such as discussion, inquiry, debate, and simulation are also associated with aspects of an open classroom climate for civic learning (Siegel-Stechler, 2021). In the present study, contextual comic scenarios can be understood as prompts that make values discussable. This is especially relevant to Pancasila education because the learning outcome involves understanding what values mean in situations rather than only reproducing definitions.

The study also extends emerging Indonesian work on comic-based Pancasila education. Digital comics have been developed around Bhinneka Tunggal Ika and Pancasila content (Nurfauzi et al., 2024), and digital comic media have been evaluated in Grade IV Pancasila learning (Reinita & Sarki, 2025). Rahman and Anas (2024) likewise highlight the potential of comic learning media designed around critical thinking, while Salamor (2020) demonstrates a longer-standing interest in moving civic education toward learning models that support judgment and engagement. The present study contributes to this line of work by evaluating an explicitly integrated comic-and-deep-learning condition and by reporting both inferential comparisons and normalized gain.

The practical implication is that teachers should use comics as structured discussion and reflection tools rather than simply as supplementary reading. A lesson can ask students to identify a dilemma in a panel, name the Pancasila value involved, explain why a character's action is or is not appropriate, compare alternative responses, connect the situation with an experience at school, and formulate a short reflection. This sequence makes the comic a prompt for interpretation and reasoning. It is also compatible with the multimedia-design principle that representations should be selected and organized in relation to the learning objective rather than added for decoration (Noetel et al., 2022; Schewior & Lindner, 2024).

Limitations and Future Research

The scope of the empirical evidence must remain precise. The achievement test measured students' cognitive understanding of Pancasila values; it did not directly measure long-term character development, stable habits, or sustained value-consistent behavior outside the classroom. Observation and documentation were supporting data sources, but the study record does not report a separate behavioral outcome analysis. Consequently, claims that the intervention formed character or produced durable behavioral change would exceed the evidence. The most defensible conclusion is that the integrated approach was associated with stronger cognitive understanding and learning gains within the participating Grade V sample.

Transferability is also limited by the sample and design. The study included 40 students from one elementary school, and group assignment was nonrandom. Although baseline performance was considered and the statistical assumptions for the reported parametric tests were met, nonequivalent-group designs remain vulnerable to selection effects, teacher effects, and other unmeasured classroom differences. The estimated effect size should therefore be

treated as a strong result in this sample rather than as a universal estimate of comic-based Pancasila instruction. Replication across schools, teachers, regions, and more diverse student populations is necessary before broader generalization.

Future research should strengthen both measurement and intervention transparency. Instrument development should be reported through a clear test blueprint, content-validation procedure, reliability coefficient, and examples of items aligned with the construct domains. Intervention fidelity should be documented through session-level records and a structured observation rubric. Longer-term follow-up is needed to determine whether improved conceptual understanding is retained and whether it relates to observable behavior in authentic settings. Multi-site or randomized designs, where feasible, would reduce selection threats. Qualitative interviews and student reflections could also clarify which narrative, visual, discussion, and reflection features are most influential, an issue that remains important because comic benefits can vary according to design and content (Tay et al., 2024; Walsh et al., 2024).

CONCLUSION

This quasi-experimental study provides evidence that comic media integrated with a deep learning approach was associated with stronger understanding of Pancasila values among the 40 Grade V students studied. The experimental group improved from a mean pretest score of 59.75 to a posttest mean of 82.75, whereas the control group improved from 55.00 to 65.00. Both groups showed significant within-group improvement, but the experimental group achieved a significantly higher posttest score, $t(38) = 7.421$, $p < .001$, mean difference = 17.75, with an estimated Cohen's d of 2.35. The experimental group's N-Gain was moderate (0.5801), compared with a low N-Gain in the control group (0.2218). The findings support the instructional use of contextual comic narratives combined with meaningful, mindful, and joyful learning activities to strengthen cognitive understanding of Pancasila values in the studied classroom. Because the study used a nonrandomized single-school sample and did not directly measure long-term character or behavioral change, the conclusion should remain limited to cognitive learning outcomes in comparable contexts and should be tested through broader replication.

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