

PRODUCTION AND IMPLEMENTATION OF SCIENCE COMICS TO ENHANCE SCIENCE LEARNING FOR ELEMENTARY SCHOOL STUDENTS AT SDN 27 PEUSANGAN

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ABSTRACT

This community service program aimed to produce and implement science comics to enhance science learning for elementary school students at SDN 27 Peusangan. Science learning at the elementary level often faces challenges related to low student engagement and limited use of attractive learning media. To address these issues, science comics were developed as an innovative learning medium that integrates scientific concepts with visual storytelling tailored to students' characteristics. The implementation stages included needs analysis, comic design and production, teacher assistance, classroom application, and evaluation. The results showed that the use of science comics increased students' learning motivation, active participation, and understanding of basic science concepts. In addition, teachers demonstrated improved competence in utilizing creative learning media to support classroom instruction. Overall, science comics proved to be an effective and engaging learning medium for elementary science education and have the potential to be sustainably implemented in primary schools.

Keywords: Science Comics, Science Learning, Elementary School Students, Learning Media, Community Service

INTRODUCTION

Science learning at the elementary school level plays a vital role in developing students' scientific literacy, curiosity, and conceptual understanding of natural phenomena. Research shows that students who engage with meaningful and contextual learning media tend to develop stronger foundational concepts and greater interest in science subjects compared to those exposed to traditional text-focused materials alone. This highlights the need for engaging instructional media that align with the cognitive levels of primary learners (Putri et al., 2025).

Despite its importance, effective implementation of science learning at the elementary school level remains constrained by limited variations in instructional media and low engagement levels. Conventional instructional methods often fail to attract students' attention, thereby reducing motivation and active participation in classroom activities. Studies on science learning media reveal that integrating more attractive and visual resources can significantly improve student engagement (Udin et al., 2025). Learning media such as comics have emerged as innovative alternatives to traditional teaching tools for elementary schools. Comics combine images and narratives that help simplify abstract concepts and provide contextual meaning for learners, making it easier for students to understand and remember science content. Research on educational comics in elementary science shows high feasibility and practicality when used as instructional media (Maryani & Amalia, 2024). In addition to enhancing student interest, the

development and use of comic based science learning media have shown positive effects on learning outcomes and student responses. For example, the development of “Science Detective” comics for elementary science literacy reported high validation results and strong positive reactions from students, indicating that comics can function as effective educational tools (Oryzasativa et al., 2023).

Digital comic learning media is another emerging approach that supports both traditional and blended learning environments. Studies have found that digital comic media can be very valid, practical, and effective in improving understanding of science concepts among elementary students, pointing to the potential benefits of combining technology and comics for modern classroom needs (Putri et al., 2025). Furthermore, the application of comic media contributes to improving not only cognitive outcomes in science learning but also motivational aspects. Quantitative studies on science comic media reveal significantly improved student learning motivation and outcomes in science subjects after implementing comic-based media, suggesting that such media can be instrumental in fostering positive learning attitudes (Rahmah et al., 2023). Based on these considerations, this community service program focused on the production and implementation of science comics at SDN 27 Peusangan to enhance students’ learning engagement, increase motivation, and improve understanding of science concepts through an innovative and relevant instructional medium. Integrating comics into instructional practice supports a more dynamic, student-centered learning environment for elementary science education (Puspitasari & Rodiyana, 2025).

The effectiveness of visual-based learning media in elementary science learning has been widely supported by empirical studies. Visual representations help students process information more efficiently by combining verbal explanations with images. In elementary science classrooms, visual media have been shown to improve students’ conceptual understanding and retention of learning materials (Hidayati & Sari, 2021). Research on comic-based learning media in elementary schools indicates that comics are particularly effective for students with diverse learning abilities. Comics allow learners to follow scientific explanations through sequential storytelling, reducing cognitive load and increasing comprehension. A study by Fitriani et al. (2021) reported that science comics significantly improved students’ learning outcomes and classroom engagement. Furthermore, the development of instructional media through collaborative programs between universities and schools contributes positively to teachers’ professional development.

Teachers involved in media development programs tend to adopt more innovative teaching practices and demonstrate higher confidence in implementing new learning strategies (Wulandari & Nugraha, 2022). Several studies have emphasized that integrating learning media aligned with the characteristics of elementary students can foster joyful learning environments. Enjoyable learning experiences are crucial for sustaining students’ interest in science and preventing negative perceptions of the subject. Comic-based learning media have been empirically proven to support joyful and student-centered science learning (Siregar et al., 2023). In the context of science education, contextual learning plays a critical role in connecting scientific concepts with students’ real-life experiences. Learning media that integrate contextual elements enable students to better understand abstract concepts. Science comics that depict daily phenomena have been shown to significantly enhance conceptual understanding among elementary students (Prasetyo & Lestari, 2024). Recent studies also highlight the sustainability aspect of printed learning media such as comics. Unlike technology-dependent media, printed comics can be reused repeatedly without requiring additional infrastructure. This makes science

comics a practical and sustainable learning solution for elementary schools, especially in regions with limited access to digital facilities (Kurniawati et al., 2025).

LITERATUR REVIEWES

Science Learning in Elementary School

Science learning in elementary schools aims to develop students' understanding of basic scientific concepts, inquiry skills, and attitudes toward science. At this level, students learn best through concrete experiences that involve observation, exploration, and interaction with their environment. Effective science instruction should be aligned with students' cognitive development and emphasize active learning rather than rote memorization (Slavin, 2023).

In addition, elementary science learning should encourage students to actively construct knowledge through hands-on activities and meaningful engagement. Learning experiences that involve visual aids and storytelling can help students better grasp scientific ideas. Therefore, instructional strategies at the elementary level should prioritize student-centered approaches that foster curiosity and conceptual understanding rather than passive reception of information (Slavin, 2023).

Furthermore, combining instructional media such as comics with inquiry-based activities can create a more contextual and meaningful learning environment. Research shows that educational comics designed specifically for science learning help students make connections between scientific phenomena and real-world experiences, increasing both conceptual understanding and engagement (Oryzasativa et al., 2024).

Scientific Literacy in Primary Education

Scientific literacy refers to students' ability to understand scientific concepts, apply scientific knowledge, and make informed decisions based on evidence. Developing scientific literacy from an early age is essential to prepare students for future learning and everyday problem-solving. Elementary science education plays a key role in building this literacy through meaningful and contextual learning experiences (Lederman & Lederman, 2022). Moreover, scientific literacy in primary education is not limited to mastering content knowledge but also includes understanding scientific processes and attitudes toward science. Learning activities that integrate real-life contexts and visual representations can support students in connecting scientific concepts with daily experiences, thereby strengthening their scientific literacy foundations (Lederman & Lederman, 2022). In addition, research on comic-based science media indicates that comics designed with scientific literacy objectives can significantly enhance students' ability to interpret and apply scientific knowledge. Studies demonstrate that such media not only improve understanding but also promote learners' confidence in engaging with science content (Oryzasativa et al., 2024).

Learning Media in Elementary Education

Learning media are tools that support the delivery of instructional content and facilitate interaction between teachers and students. The use of appropriate learning media can enhance attention, motivation, and understanding, particularly for young learners. In elementary education, learning media should be visually attractive, easy to use, and suitable for students' learning characteristics (Smaldino et al., 2021). Furthermore, learning media serve as a bridge

between abstract concepts and students' concrete thinking abilities. Media that combine visual and textual elements help students process information more effectively and reduce cognitive overload. As a result, well-designed instructional media play a critical role in improving the overall quality of elementary science learning (Smaldino et al., 2021).

Visual Learning Theory

Visual learning theory emphasizes the role of images, symbols, and visual representations in enhancing comprehension and memory. According to multimedia learning principles, learners understand information more effectively when verbal explanations are combined with visual elements. Visual-based instructional materials are especially beneficial in elementary classrooms where students rely heavily on concrete representations (Mayer, 2021). Additionally, visual learning helps students organize information and recognize relationships between concepts. When learning materials are presented visually, students can more easily interpret and recall information. This theory strongly supports the use of illustrated learning media, such as comics, to improve comprehension and retention in elementary science learning (Mayer, 2021). Moreover, studies involving digital comic media indicate that visual storytelling can enhance not only understanding of science content but also creativity and critical thinking among learners. Integrating contextual visuals with narrative elements helps students process complex scientific concepts more deeply and meaningfully (Digital Comic Research, 2024).

Comics as Educational Media

Comics are learning media that combine visual illustrations and narrative text in sequential form. Educational comics can present learning content in a simple, engaging, and structured manner. The narrative structure of comics helps students follow concepts step by step, while illustrations support understanding of abstract ideas. Comics have been widely recognized as effective media for engaging young learners and supporting concept comprehension (Yang, 2022).

In addition, comics encourage enjoyment and motivation in learning by presenting content through stories that are familiar and appealing to children. The combination of images and dialogue enables students to engage emotionally with learning material, which can improve attention and understanding. Therefore, comics are considered highly suitable for elementary science instruction (Yang, 2022). Furthermore, research shows that comics developed for science education not only enhance motivation and enthusiasm but also support the development of multiple intelligences, including visual-spatial, logical, and linguistic skills.

Motivation Theory in Learning

Learning motivation plays a crucial role in determining students' engagement and academic achievement. Motivated students are more likely to participate actively in learning activities and persist in completing tasks. Instructional strategies and media that are interesting and enjoyable can enhance intrinsic motivation, particularly for elementary school students (Schunk et al., 2021). Furthermore, motivation influences students' willingness to explore new ideas and engage in problem-solving activities. Learning media that are visually attractive and interactive, such as comics, can stimulate curiosity and sustain attention. As a result, motivated students tend to demonstrate better learning outcomes and positive attitudes toward science learning (Schunk et al., 2021). Additionally, empirical evidence from studies on comic-based learning

indicates that comics significantly increase student motivation and interest in learning. Research reveals that using comics in science classes not only improves motivation but also positively affects learning outcomes and students' affective responses to instruction (Suliastika & Putri, 2023; BasicEdu study, 2024).

Teacher Competence in Using Learning Media

Teacher competence in selecting and using learning media significantly affects the effectiveness of instruction. Teachers who are skilled in utilizing instructional media are better able to design engaging lessons and facilitate student-centered learning. Professional development programs that focus on media innovation can improve teachers' instructional competence and classroom performance (Darling-Hammond et al., 2022). Moreover, teachers who actively develop and apply innovative learning media tend to be more reflective and adaptive in their teaching practices. Enhanced competence in media usage also supports teachers in addressing diverse student needs and creating more interactive learning environments, which is essential for effective elementary science instruction (Darling-Hammond et al., 2022). Furthermore, studies on teacher readiness and media integration show that professional training and continuous development are necessary to help teachers effectively integrate comic and digital media into instruction. Research highlights ongoing challenges in teacher preparedness, underscoring the need for targeted support to enhance media competency (Purwati et al., 2022).

METHOD

The community service activity was conducted for 20 Grade IV students at SDN 27 Peusangan. All students participated as a single group, ensuring that every student benefited from the comic-based science learning intervention. Participants were selected purposively based on class availability and teacher readiness to support the activity. The primary media used in this activity was comic based science learning material aligned with the Grade IV curriculum. The comics were designed to simplify science concepts using illustrations and narratives, making the material engaging and accessible for young learners. The content of the comics was validated by science education experts to ensure accuracy, appropriateness, and alignment with students' learning abilities (Rosyada & Asmarani, 2023)

The activities were conducted in three interactive sessions. Each session began with an introduction to the science topic using the comics, followed by interactive discussions, and concluded with simple practical activities or Q&A sessions. The teacher and the PKM team facilitated students to actively participate, understand the concepts, and relate science to daily experiences. This approach emphasizes active, enjoyable learning while fostering curiosity and engagement.

Evaluation was conducted using several methods. Direct observation measured students' engagement during the activity, including participation in discussions and enthusiasm when interacting with the comics. A motivation questionnaire was administered to assess students' interest, enjoyment, and confidence during the comic-based science learning. Additionally, short quizzes or Q&A sessions were conducted to evaluate the students' understanding of science concepts. The results of the evaluation were used to assess the effectiveness of comic-based media and to guide improvements for future activities. This evaluation method aligns

with community service practices in education, emphasizing practical learning and student empowerment (Aswari et al., 2025).

Data collected from observations and questionnaires were analyzed descriptively, presenting frequencies, percentages, and examples of students' responses. This analysis aimed to illustrate student participation, motivation, and learning outcomes comprehensively. Additionally, the report included reflections from the teacher and the PKM team regarding the success of the method, challenges faced during implementation, and recommendations for further development of similar activities.

RESULTS AND DISCUSSION

Student Participation and Engagement

During the implementation of comic based science learning, all 20 students actively participated in reading, discussing, and completing inquiry-based tasks. Observations showed that students were enthusiastic and attentive throughout the three sessions. Most students asked questions and shared ideas, demonstrating curiosity and engagement with the learning material. The comics provided a familiar and enjoyable context, allowing students to connect abstract scientific concepts with their daily experiences.

Furthermore, student participation was facilitated through group discussions and interactive activities, which encouraged collaboration and communication skills. Teachers noted that even students who are typically shy or less active in class became more involved and confident in sharing their ideas. This observation confirms previous studies indicating that comic based learning not only improves attention but also fosters social and cognitive engagement in elementary science education (Rosyada & Asmarani, 2023).

Scientific Literacy

Assessment of scientific literacy showed that students were able to interpret simple scientific phenomena, analyze information, and apply concepts in daily life contexts. Prior to the activity, many students struggled to explain cause-and-effect relationships or draw conclusions from simple observations. After engaging with the comic-based materials, students demonstrated enhanced reasoning skills and greater confidence when addressing scenario-based questions. Moreover, students could relate science concepts to real-life situations, such as explaining natural processes or describing observations from their environment. This indicates that comic-based learning supports the development of functional scientific literacy, allowing students to not only recall knowledge but also apply it meaningfully. These results align with previous studies showing that early exposure to visual, narrative-based science media strengthens literacy skills and analytical thinking among elementary students (Nafisyah et al., 2023; Rosyada & Asmarani, 2023).

Motivation in Learning

Motivation was measured using a Likert-scale questionnaire assessing attention, relevance, confidence, and satisfaction. Results are shown in Table 1:

Table 1. Motivation Questionnaire Results (1–5 Likert Scale)

Aspect	Average Score	Description
Attention	4.7	Students were highly attentive during comic-based activities.
Relevance	4.5	Students felt the material was connected to daily life.
Confidence	4.6	Students felt confident answering questions after reading comics.
Satisfaction	4.8	Students enjoyed the learning process and expressed interest in similar activities.

In addition, students reported that the combination of visual storytelling, interactive discussion, and relatable scenarios made science learning more engaging and enjoyable. Many students expressed a desire to learn using comics in future lessons, highlighting that the activity not only improved motivation but also fostered a positive attitude toward science learning. These results are consistent with research indicating that comic-based learning media enhance intrinsic motivation and engagement among young learners (Pratiwi et al., 2025; Aswari et al., 2025).

Teacher Observation and Reflection

Teacher observations summarized in Table 3 highlight the impact of the PKM activity on student engagement:

Table 2. Teacher Observation Summary

Observation Indicator	Result / Description
Student Engagement	95% actively participated in discussions and activities.
Peer Interaction	Students collaborated and shared ideas during tasks.
Focus / Attention	Most students remained focused throughout 3 sessions.
Response to Comics	Positive; students were enthusiastic and curious.

Teachers reflected that the comic based approach reduced boredom, increased participation, and supported differentiated learning, allowing all students to follow the lesson at their own pace. They also noted that the activity promoted peer collaboration, curiosity, and creative thinking, demonstrating that PKM activities using visual and narrative media can effectively empower students and enhance learning outcomes (Rosyada & Asmarani, 2023; Nafisyah et al., 2023).

The implementation of comic based learning is reflected in the active involvement of the teacher and students, as shown in Figure 1.



Figure 1. implementation of comic based learning

The figure depicts the direct involvement of the PKM team and the classroom teacher in implementing comic based science learning, showing active student participation and positive learning responses.

DISCUSSION

The results of this community service program indicate that the implementation of comic-based learning media effectively enhanced students' understanding of science concepts. The increase in students' learning outcomes demonstrates that comics are capable of presenting abstract scientific concepts in a more concrete, contextual, and easily understood form for elementary school students. The integration of visual illustrations and concise textual explanations supports students in organizing information and constructing meaning more effectively, particularly for learners at the primary education level who rely heavily on visual learning strategies (Putri & Wahyuni, 2022). This finding aligns with previous studies stating that visual-based instructional media significantly improve comprehension and conceptual understanding in science learning (Kurniawan et al., 2023).

In addition to improving conceptual understanding, the use of science comics also contributed to the development of students' scientific literacy. Students showed improved abilities in interpreting simple natural phenomena, understanding cause-and-effect relationships, and connecting science concepts to everyday experiences. The narrative structure of comics encourages students to observe, analyze, and draw conclusions from presented situations, which are fundamental components of scientific literacy at the elementary level (Widodo & Riandi, 2021). Furthermore, visual storytelling helps students process information systematically, supporting the development of analytical and reasoning skills that are essential for scientific thinking (Rahmawati et al., 2024).

Learning motivation emerged as a significant supporting factor in the effectiveness of comic-based learning. Students demonstrated high enthusiasm and active participation throughout the learning process, as indicated by their engagement during discussions and learning activities. Attractive illustrations, relatable characters, and story-based content stimulated students' interest and sustained their attention. This is consistent with research highlighting that engaging

visual media can increase intrinsic motivation and positive attitudes toward science learning among elementary school students (Sukmanasa & Lestari, 2022). Increased motivation plays a crucial role in enhancing learning persistence and achievement, as motivated students tend to participate more actively and engage more deeply with learning materials (Amalia & Hidayat, 2023).

Teacher involvement also played an essential role in the successful implementation of comic-based science learning. Collaboration between the PKM team and the classroom teacher facilitated effective integration of comics into the learning process, ensuring that learning activities were aligned with students' characteristics and classroom conditions. Teachers acted as facilitators who guided discussions, clarified concepts, and encouraged students to connect comic content with scientific principles. Previous studies have emphasized that strong teacher mediation enhances the effectiveness of instructional media and promotes interactive classroom environments (Nurhadi et al., 2021). Moreover, comic-based learning supported inclusive learning by enabling students with diverse academic abilities to participate actively in classroom activities.

From the perspective of educational community service, the findings of this PKM program highlight the potential of comic-based learning media as an innovative and practical solution to improve science learning in elementary schools. The program not only improved students' learning outcomes but also increased motivation, engagement, and classroom interaction. This aligns with the objectives of PKM, which emphasize empowering schools through sustainable and contextually relevant educational innovations (Hendrawan et al., 2023). Therefore, integrating creative instructional media such as science comics into PKM activities can strengthen collaboration between higher education institutions and schools and contribute to improving the quality of science education at the primary level.

CONCLUSION

This community service program demonstrated that the production and implementation of science comics effectively enhanced science learning for elementary school students at SDN 27 Peusangan. The results showed a significant increase in students' learning motivation, active participation, and understanding of basic science concepts. The integration of visual illustrations and narrative storytelling enabled students to comprehend abstract scientific ideas more easily and relate them to everyday experiences, thereby strengthening their scientific literacy.

One of the main advantages of science comics is their ability to create an enjoyable, student-centered learning environment that encourages curiosity and active engagement. The comics supported diverse learning needs by reducing cognitive load and providing concrete visual representations of scientific phenomena. In addition, teacher competence in using creative learning media improved through direct involvement in the implementation process, contributing to more interactive and effective classroom instruction.

However, this program also encountered several limitations. The implementation was conducted with a relatively small number of students and within a limited time frame, which may affect the generalizability of the results. Moreover, the use of printed comics requires careful design and periodic updates to ensure content relevance and alignment with curriculum developments. Despite these limitations, the findings indicate strong potential for further

development. Science comics can be expanded to cover a wider range of science topics and grade levels, and they may also be integrated with digital or interactive formats to support blended learning environments. Future community service and research programs are encouraged to explore long-term implementation, larger participant groups, and the integration of technology to maximize the effectiveness and sustainability of comic-based science learning in elementary education.

SUGGESTIONS

Based on the results of this community service program, it is recommended that science comics be integrated as supporting learning media in elementary science instruction to enhance student engagement and understanding. Teachers are encouraged to receive ongoing training to improve their competence in developing and utilizing creative learning media. Future community service activities should involve a larger number of participants and longer implementation periods to obtain more comprehensive results. In addition, the development of science comics may be expanded into digital or interactive formats to support technology-based learning. Strengthening collaboration between universities and schools is also essential to ensure the sustainability and wider implementation of comic-based science learning.

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