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Digital Comic Media for Reading Comprehension of Fifth-Grade Students

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Abstract: This study was motivated by the lack of media use in learning activities, causing students to have difficulty in reading comprehension of stories. This study aims to describe the development process, feasibility, and effectiveness of digital comic media. This research is a Research and Development of the ADDIE model with a quantitative approach. Data sources came from teachers, students, documents, and experts. Data collection is conducted through various test techniques, including pre-tests and post-tests, as well as non-test methods such as interviews, questionnaires, and documentation. Data were validated using item analysis. The data analysis technique consists of a normality test and a paired t-test. The results of material expert validation achieved a percentage of 93%, media expert validation achieved a percentage of 90%, student response questionnaires achieved percentages of 86% and 89%, and teacher response questionnaires achieved percentages of 88% and 92%. The results of the paired t-test indicate that the development of digital comics has significantly improved the story comprehension of fifth-grade students at SDN Podorejo 03. The development of digital comic media supports SDG 4 (Quality Education).

Keywords: *digital comic; learning media; reading comprehension*

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INTRODUCTION

The Regulation of the Minister of Education, Culture, Research, and Technology Number 12 of 2024 outlines that the Merdeka Curriculum serves as the most recent educational framework for all educational institutions in Indonesia. Within this curriculum, Indonesian is designated as a mandatory subject in both primary and secondary education, with a focus on developing language skills (Melani & Gani, 2023). Language skills are categorized into four areas: speaking, listening, writing, and reading (Syamsuddin, 2021). Reading involves the process of perceiving and comprehending written content, allowing readers to access and understand the information presented in the text (Alpian & Yatri, 2022; Muman, 2025). Reading is a vital aspect of an individual's everyday life, especially in the era of globalization, where rapid changes and developments are prevalent(Almadiliana et al., 2021). By reading, a person can get many benefits, including increased insight and knowledge (Jumriah & Fitriani, 2022), training the brain to think creatively (Nazaruddin & Mariyah, 2023), and developing thinking (Komalasari & Riani, 2023).

There are still a few studies that examine the use of digital comics for improving reading comprehension in primary education. Based on the Decree of the Head of the Education Standards, Curriculum, and Assessment Agency of the Ministry of Education, Culture, Research and Technology Number 032/H/KR/2024, the Learning Outcome of phase C of the reading and viewing element shows that students should have language skills that can be the basis and capital in carrying out interactions according to conditions or situations. However, observations in the field indicate that students' comprehension of the information found in reading materials remains quite limited (Sari et al., 2021). Students' limited ability to comprehend the information in reading materials can be partly attributed to teachers' reliance on textbooks alone for their instructional activities, without incorporating additional learning media (Zakiyah et al., 2022). In addition, the low ability is also caused by several things, such as the lack of motivation of students to study seriously (Muliawanti et al., 2022), limited reading of books as a means of reading (Sampe et al., 2023), and unfavorable environmental conditions, so that students find it challenging to focus when reading (Sarika, 2021).

Interviews conducted with fifth-grade teachers in 2024 revealed several challenges faced by fifth-grade students at SDN Podorejo 03 in Semarang. One significant issue is the students' insufficient reading comprehension skills, particularly in analyzing the intrinsic elements of stories. This deficiency is evident in the academic performance of 26 fifth-grade students during the 2024/2025 school year, particularly in Indonesian language subjects focused on the intrinsic elements of stories. The results indicate that 81% of these students scored below the minimum competency standard, suggesting that their reading comprehension abilities are still quite low. Furthermore, the low reading comprehension skills among fifth-grade students at Podorejo 03 Elementary School align with findings from the OECD's 2022 PISA assessment, which indicated a decline in reading interest among Indonesians compared to 2018. Several things or factors can affect reading interest

(Agustin et al., 2022). Several factors that influence reading interest must be addressed wisely, especially by a teacher, who is a key figure in learning activities (Maryani et al., 2020). To address these conditions, a breakthrough is needed, which can be achieved through the use of media in learning activities (Rohani, 2020). Learning media is a tool that teachers can use to help facilitate the delivery of information or material to students (Maryani et al., 2020). One of the learning media that teachers can use to improve students' learning outcomes is graphic media, specifically digital comics (Narestuti et al., 2021). Digital comics are a story accompanied by images that can be displayed online (Nindyana & Aryanto, 2022). Numerous benefits can be experienced by utilizing digital comics as learning media (Rohima, 2023). The benefits of digital comics in learning activities include improving the quality of learning (Tsuroyya et al., 2022), improving students' reading skills (Astutik et al., 2021), and strengthening students' character (Muhaimin et al., 2023).

Digital comic media can address the challenges posed by suboptimal learning activities resulting from limited media and resources (Zakiyah et al., 2022). Additionally, digital comic media can enhance student learning outcomes (Haryanto et al., 2023). Furthermore, there is an improvement in student performance following the implementation of digital comic media in their learning (Elfina et al., 2023). The distinction between this study and previous research lies in the fact that this research specifically developed digital comic media based on the Learning Outcomes of Indonesian language subjects, focusing on phase C elements of reading and viewing as outlined in the Decree of the Head of the Education Standards, Curriculum and Assessment Agency of the Ministry of Education, Culture, Research and Technology Number 032/H/KR/2024. Phase C learning outcomes include "Learners can analyze information from various types of texts and the values contained in literary texts from visual and/or audiovisual texts." Digital comic media has three parts. The first part comprises the front cover, table of contents, preface, learning outcomes, learning objectives, reading instructions, and character introduction. The second part contains the story. The third part includes the learner competency test, author, and back cover. Digital comic media can be accessed both offline and online. Offline, it is available in PDF format, while online access is provided through the Heyzine Flipbooks website.

The choice of digital comic media is driven by its intent and purpose, as it allows learning materials to be presented through engaging illustrations accompanied by text. This approach aims to enhance students' interest in reading and facilitate their understanding of the subject matter. Furthermore, incorporating digital comic media into learning activities is anticipated to introduce innovation, making the learning experience more meaningful and less monotonous. It also supports the achievement of CP phase C elements related to reading and viewing, enabling students to develop language skills that serve as a foundation for effective interaction in various contexts, particularly in comprehending information from reading materials.

METHODS

This research is a quantitative Research and Development (R&D) study. It follows the ADDIE model, which includes the stages of Analysis, Design, Development, Implementation, and Evaluation (Branch, 2010). The primary objective of this study is to outline the development process, assess the feasibility, and evaluate the effectiveness of digital comic media.

The analysis stage aims to identify existing problems in the field. Information is gathered through unstructured interviews and documentation of personal data and student learning outcomes. The design stage follows as the second phase of development, where the product design is created. The third stage, development, involves refining the designed product to align with the planned specifications. This study's development includes creating story content, defining product specifications, and ensuring accessibility. To ensure the product meets quality standards, a validation process is conducted, involving assessments by two experts: a material expert and a learning media expert. The analysis employs percentage corrections for evaluation. The fourth stage, implementation, involves using the media in school learning activities, utilizing a pre-experimental design based on a group pretest-posttest model (Sugiyono, 2019). Finally, the evaluation stage assesses the developed learning media, reviewing the entire process from production to the established specifications.

The research was conducted from September 2024 to February 2025 at SDN Podorejo 03, Semarang City. This study collected two types of data: qualitative and quantitative. Qualitative data were gathered through interviews with classroom teachers and observations of their teaching activities. Quantitative data were derived from the learning outcomes of students in Indonesian language subjects, specifically focusing on the intrinsic elements of stories. The data sources for this research included teachers, 26 students, relevant documents, and two experts.

Data collection methods encompassed both test and non-test techniques. The testing methods included pre-tests and post-tests, while non-test methods consisted of interviews, questionnaires, and documentation. To ensure the validity of the data, item analysis was conducted. The data analysis process was divided into two phases: initial data analysis and final data analysis. The initial phase included a normality test, while the final phase employed a paired t-test.

RESULT AND DISCUSSION

This research produces products in the form of digital comic media through the ADDIE procedure, which consists of Analysis, Design, Development, Implementation, and Evaluation. At the analysis stage, all information is thoroughly collected to identify the problems that exist at SDN Podorejo 03. The techniques used in collecting information include conducting unstructured interviews with fifth-grade teachers, as well as documenting students' personal data and learning outcomes. Based on the results of unstructured interviews with fifth-grade teachers, supported by personal data and student learning outcomes, problems are experienced when teachers carry out learning activities. The problem experienced is the students' inability to analyze the intrinsic elements contained in the story. The low reading comprehension skills of 26 fifth-grade students from SDN Podorejo 03 in the 2024/2025 school year are evident in their learning outcomes in Indonesian language subjects, particularly with the material on Intrinsic Elements of Stories. The learning results indicate that 81% of students scored below the KKTP, suggesting that their reading comprehension skills, particularly in understanding stories, are still relatively low.

During the design stage, the digital comic media designs were created using Canva. The media is formatted in a portrait orientation, measuring 21 x 29 cm, and features the Happy Font TH and Bangbang fonts. The digital comic media design has three parts. The first part comprises the front cover, table of contents, preface, learning outcomes, learning objectives, reading instructions, and character introduction. The second part contains the story. The third part includes the learner competency test, author, and back cover.

In the development stage, the previously created media design was enhanced and finalized into the final product. Making digital comic media is done using the Sketchbook and Canva applications. The steps for making digital comic media products include creating layouts for each part of the digital comic; creating images in the Sketchbook application according to the story that has been compiled; saving images from the Sketchbook application to the gallery; exporting images from the gallery to Canva, inserting exported images into the layout that has been created; inserting the title of digital comic media using the Bangbang font; selecting and inserting conversation clouds in the story section; inserting conversations using the Happy Font TH font; and completing all parts of digital comic media from the front cover to the back cover.

After the development of the digital comic media product, the next stage was validation, which involved input from two types of experts: media experts and material experts. Media experts were responsible for evaluating the quality and suitability of the media product itself, ensuring it met the necessary standards and functioned effectively. Meanwhile, material experts focused on reviewing the content and assessing its quality and relevance to ensure that the information presented was accurate and appropriate. The evaluations provided by both experts were then analyzed using descriptive data calculations, which involved converting quantitative data into qualitative insights. For the analysis, percentage corrections were utilized.

Table 1. Recapitulation of Expert Validation Results for Material and Media

Validation	Acquired Score	Maximum Score	Percentage	Criteria
Material	60	64	93%	Highly suitable
Media	58	64	90%	Highly suitable

In the evaluation conducted by material experts, digital comic media achieved a score of 60 out of a possible 64. This translates to a feasibility percentage of 93%, indicating that it is highly suitable. Similarly, in the assessment by media experts, digital comic media received a score of 58 out of 64, resulting in a feasibility percentage of 90%, which also categorizes it as very feasible. These validation outcomes confirm that digital comic media meets the necessary standards for effective use in educational settings. After receiving positive evaluations from both material and media experts, the digital comic media underwent a small-group trial. This trial aimed to evaluate how the media functioned in practice and to identify any potential issues that could emerge when applied in larger classroom settings. Upon completion of the trial, both teachers and students were asked to fill out a questionnaire to share their experiences. The purpose of this questionnaire was to gather feedback on the effectiveness and usability of digital comic media in educational activities.

Table 2. Recapitulation of Student and Teacher Response Questionnaire Results

Activity	Questionnaire	Percentage	Criteria
Small group trial	Student	86%	Highly suitable
	Teacher	88%	Highly suitable
Large group trial	Students	89%	Highly suitable
	Teacher	92%	Highly suitable

In the student response questionnaire, digital comic media achieved feasibility percentages of 86% and

89%, categorizing it as very feasible. Similarly, the teacher response questionnaire received scores of 88% and 92%, also placing it in the very feasible category. Feedback from both teachers and students suggests that digital comic media is highly appropriate for use in educational activities. Their responses reflect a positive reception, highlighting the media's effectiveness and suitability for enhancing the learning experience.

In the implementation phase, digital comic media was integrated into learning activities with a larger group of 26 students. The media was applied using a pre-experimental design, specifically the one-group pretest-posttest model. This approach involved administering a pre-test to students before engaging them in the learning sessions that utilized digital comic media. After completing these activities, students were given a post-test. The effectiveness of digital comic media in supporting the learning process was then evaluated by comparing the results of the pre-test and post-test. During the evaluation phase, a data analysis process is conducted, which includes both initial and final data analyses. The initial analysis involves performing a normality test, while the final analysis is carried out using a paired t-test.

Table 3. Normality Test Results for Pre-test and Post-test

Activity	Action	N	L_0	Ltable	Description
Small Group Trial	Pre-test	6	0,201	0,319	Normally Distributed
	Post-test	6	0,292	0,319	Normally Distributed
Large Group Trial	Pre-test	26	0,167	0,169	Normally Distributed
	Post-test	26	0,168	0,169	Normally Distributed

In the small group trial, the pre-test scores of the students obtained a Lo of 0.201, while the Ltable was 0.319. From these results, it can be observed that Ltable > Lo, so it can be concluded that the pre-test scores of students are normally distributed. Meanwhile, the post-test scores of the students obtained a Lo of 0.292, while the Ltable was 0.319. From these results, it can be observed that Ltable > Lo, so it can be concluded that the post-test scores of students are normally distributed. In the large group trial, the pre-test scores of students obtained a Lo of 0.169, while the Ltable was 0.169. From these results, it can be observed that Ltable > Lo, so it can be concluded that the pre-test scores of students are normally distributed. Meanwhile, the post-test scores of students obtained a Lo of 0.168, while Ltable = 0.169. From these results, it can be observed that Ltable > Lo, so it can be concluded that the post-test scores of students are normally distributed.

Table 4. Results of the Average Difference Test for Pre-test and Post-test

Activity	Action	N	Average	Significance Level	Two-Tailed	Description
Small Group Trial	Pre-test	6	50	0,05	0,00	Ho Rejected
	Post-test	6	76,66			Ha Accepted
Large Group Trial	Pre-test	26	44,61	0,05	0,00	Ho Rejected
	Post-test	26	79,61			Ha Accepted

In the small group trial, the significance limit was 0.05, while the two-tailed p-value was 0.00. This condition indicates that the significance limit is greater than two-tailed, so H0 is rejected and H1 is accepted. In the large group trial, the significance limit was 0.05, while the two-tailed p-value was 0.00. These conditions indicate that the significance limit is greater than two-tailed, so H0 is rejected and H1 is accepted. These results indicate that the development of digital comics significantly improved the story comprehension of fifth-grade students at SDN Podorejo 03.

Digital comic media is designed to align with the learning outcomes outlined for Indonesian language subjects in Phase C, specifically focusing on the elements of reading and viewing as stated in the Decree of the Head of the Education Standards, Curriculum, and Assessment Agency of the Ministry of Education, Culture, Research, and Technology Number 032/H/KR/2024. The learning outcome for Phase C specifies that learners should be able to analyze information from various types of texts and understand the values presented in literary works, whether visual or audiovisual. The digital comic media is structured into three main sections. The first section includes the front cover, table of contents, author's biography, reading instructions, learning outcomes, learning objectives, and character introductions. The second section presents the main story, while the third section features a learner competency test and the back cover. This media can be accessed in both offline and online formats. Offline via PDF and online through the Heyzine Flipbooks website.

Digital comic media contains stories that align with the Learning Outcomes of Indonesian language subjects, specifically the phase C elements of reading and viewing, as outlined in the Decree of the Head of the Education Standards, Curriculum, and Assessment Agency of the Ministry of Education, Culture, Research, and Technology Number 032/H/KR/2024. Phase C learning outcomes include "Learners can analyze information from various types of texts and the values contained in literary texts from visual and/or audiovisual texts." Digital comic media has three parts. The first part comprises the front cover, table of contents, author's bio, reading

instructions, learning outcomes, learning objectives, and character introduction. The second part contains the story, and the third part includes the learner competency test and the back cover. Digital comic media can be accessed both offline and online. Through offline methods, digital comic media can be accessed in PDF format. Through online methods, digital comic media can be accessed via the Heyzine Flipbooks Website.

This research offers novelty in comparison to previous studies. The novelty lies in several aspects, including media-making applications, media display, story content, and media presentation. A previous study focused on the development of digital comic media for use in Grade 5 social science classes (Putri & Suprayitno, 2021). The media content centered on the topic of the History of the Proclamation of Indonesian Independence, aiming to enhance students' understanding of this historical event through engaging and interactive storytelling. The initial stage involves creating characters manually using pencils and paper, based on their respective characteristics. After that, the manually created characters are then designed electronically using Adobe Photoshop software. In the software, researchers added dialogue between characters. Once incorporated, all elements were then saved in PDF format. Digital comic media has a portrait shape. A previous research related to the development of digital comic media was conducted in class XI IPS, using material on the Proclamation of Indonesian Independence (Siregar et al., 2024). Digital comic media consists of several components, including the front cover, comic characters, comic stories, and the cover. Digital comic media is made using the Adobe Photoshop CS application. The size of the digital comic media is 21.0 cm x 29.7 cm with a resolution of 300 dpi. Characters and backgrounds were obtained by downloading from Freepik.com. Digital comic media was initially stored in JPG format and then converted into digital form using the Heyzine Flipbook Online Website.

Another research study developed digital comic media for grade 3 students' social science subjects (Salahuddin et al., 2020). This media is intended as a support material for the main book used by students. Digital comic media has a rectangle. The rectangular shape aims to facilitate the illustration process during the development period. On the other hand, another study developed digital comic media for class VII students in the Natural Science subjects related to the solar system (Rahmatullah et al., 2020). This media was designed to be accessible through both computers and smartphones, offering flexibility in its use. It could be accessed online via the Webtoon website or offline in PDF format, making it available with or without an internet connection. The digital comic was presented in portrait format, with dimensions of 21.1664 cm by 33.86624 cm, allowing for explicit and engaging visual content. Both material and media experts evaluated the feasibility of the digital comic media. Material experts gave it a score of 93%, indicating that it falls within the "very feasible" category. Similarly, media experts rated it at 90%, also placing it in the same category. These assessments suggest that digital comic media is highly appropriate and suitable for use in educational activities. The suitability of digital comic media for educational purposes aligns with research where validation from material and media experts yielded an average score of 88%, categorizing it as very feasible (Wahid et al., 2021).

Additionally, a limited trial involving 10 students yielded a score of 83%, placing it in the highly attractive category. The validation outcomes from both experts and student feedback indicate that the developed media is appropriate for implementation in learning activities. The subsequent research conducted involved a review by content experts, who rated it at 89%, indicating that it met decent criteria (Pinatih, 2021). Design experts provided a score of 88%, also meeting decent criteria, while media experts rated it at 94%, categorizing it as very decent. Individual trials yielded a score of 90.6%, and small group trials received a score of 90.8%, both of which are classified as very decent. The evaluations from experts and users demonstrate that the developed media is appropriate for use in educational activities.

Meanwhile, the developed media received a score of 91.6% from material experts, 78.4% from media experts, and 80.3% for language feasibility (Ferdiansyah et al., 2023). Additionally, teachers rated it at 86.8%, while students gave it a score of 88.16%. These various evaluations resulted in an average score of 83.4%, placing the media in the very good category. Based on these scores, the developed media is deemed feasible for implementation in educational activities.

After conducting a feasibility assessment process involving material experts, media experts, student response questionnaires, and teacher response questionnaires, digital comic media is then implemented in Indonesian language learning activities using the Intrinsic Elements of Stories material. The results obtained were then analyzed using the normality test and paired t-test. The normality test results show that the pre-test and post-test results are normally distributed. In the paired t-test, the results showed a significance level of 0.05, while the two-tailed p-value was 0.00. These conditions indicate that the significance limit is greater than two-tailed, so that Ho is rejected and Ha is accepted. These results indicate that the development of digital comics significantly improved the story comprehension of fifth-grade students at SDN Podorejo 03. The effectiveness of digital comic media in learning activities is supported by research, which indicates that the development of digital comic media can facilitate students' understanding of the learning material being studied (Hashifah et al., 2023). With the ease of understanding learning material for students, the learning outcomes obtained will increase (Mulia & Kristin, 2023). In line with this, the development of digital comic media can address the issue of underutilization of technology as a medium in learning activities (Asti & Sukardi, 2024). In

addition, the development of digital comic media can also serve as a solution to the problem of less-than-optimal learning activities resulting from limited media and learning resources (Aulika et al., 2023). With the use of digital comic media, learning activities that utilize technology will become more interesting and can train students to think creatively (Nawafil, 2022). The attractiveness of digital comic media increases the motivation students possess to learn (Solihah et al., 2022). That way, learning activities that use digital comic media will run more optimally (Aulika et al., 2023).

The development of digital comic media supports SDG 4 (Quality Education). This can be observed in one of them, as the use of digital comics in learning activities enables students to gain a deeper understanding of technology (Rosalianisa et al., 2023). By gaining a deep understanding of technology from an early age, students will develop a strong ability to utilize technology, allowing for the positive impact of technology to be felt to the fullest and minimizing its negative effects (Anjar et al., 2021). Additionally, students will have the ability to adapt to technological developments (Astini, 2020). Thus, quality education is designed to produce a quality human being in the era of globalization, characterized by rapid changes and developments like today.

CONCLUSION

This study led to the development of a digital comic as a learning medium using the ADDIE procedure, which comprises Analysis, Design, Development, Implementation, and Evaluation. The novelty of this digital comic, compared to existing digital comics, lies in its media creation application, visual appearance, story content, and presentation. The digital comic consists of three sections. The first section includes the front cover, table of contents, author's biography, reading guidelines, learning achievements, learning objectives, and character introduction. The second section contains the story, while the third section includes student competency tests and the back cover. In an evaluation conducted by subject matter experts, the digital comic achieved a score of 60 out of a possible 64, resulting in a percentage of 93%, and was categorized as "highly feasible." Similarly, the assessment by media experts yielded a score of 58 out of 64, equating to a 90% score, which also placed it in the "highly feasible" category. These evaluations suggest that the digital comic is well-suited for use in educational activities. The analysis of students' pre-test and post-test results, performed using a paired t-test, revealed a significant improvement in learning outcomes following the integration of the digital comic into the educational process. Therefore, it can be concluded that the development of digital comics has notably enhanced the story comprehension skills of fifth-grade students at SDN Podorejo 03. Furthermore, the creation of digital comic media aligns with the objectives of Sustainable Development Goal 4 (Quality Education).

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