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# Enhancing elementary learning with Webtoon-based digital comics

**Nova Suci Wulandari** [a,1,*], **Susilo Tri Widodo** [a,2]

[a] Department of Elementary School Teacher Education, Faculty of Education and Psychology, Universitas Negeri Semarang, Jl. Raya Beringin No.15, Wonosari, Semarang, Central Java 50244, Indonesia
[1] novasuciwulandari24@students.unnes.ac.id*; [2] susilotriwidodo@mail.unnes.ac.id
* Corresponding author

**Abstract:** One innovative learned media development that could improve student learned outcomes was digital comics. Digital comics was an innovation from printed comics that accessed used the Internet network and are more efficient. This research aimed to develop and tested the feasibility of Webtoon-based digital comic media for applying Pancasila valued. Aparted from that, to found out the effectiveness of media in improved the learned outcomes of class V students during the learning process. This researched used research and development with the waterfall model according to Somerville, which had five stages. The use of the waterfall model in this research is limited to 4 stages: 1) requirements analysis; 2) design; 3) implementation; and 4) testing. The sample in this studied was 6 class V students in small class trial subjects and 23 class V students in significant class trial subjects. Data collection techniques used interviews, validation sheets, and tests. The instruments used were interview sheets, needed questionnaires, validation sheets, response questionnaires, and pretest post-test questioned (20 cognitive questions). The validation results of material and media experts showed that the media is "Very suitable" for the learning process. Teachers and students stated that the media was "Efficient" to use in the learning process. A significant difference existed between student learning outcomes before and after using Webtoon-based digital comic media $(T\ (22) = 9.20,\ p < 0.05$. These findings could have used to expand media distribution to a broader scale.

**Keywords:** digital comics; learning media; learning outcomes; Webtoon

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## 1. Introduction

Learning is an effort to create a conducive environment that encourages learning activities (Darman, 2020). Learning is an educational activity carried out consciously and systematically by teachers, students and teaching resources in a learning context to achieve the expected learning outcomes. Learning success can be reflected in students' participation level and learning outcomes (Firnanda et al., 2023; Sekarsari & Rusnilawati, 2023). 21st-century education requires knowledge to be integrated into real life so that student involvement during the learning process significantly impacts learning outcomes (Arifin et al., 2021; Mahmudah et al., 2021; Zuhra et al., 2023). Learning outcomes are the results students achieve after completing learning activities, usually expressed as grades given by the teacher to measure learning success (Dewi et al., 2020). Low interest in reading textbooks is one of the causes of expected student learning outcomes because textbooks that only contain text tend to trigger boredom. Learning failure can be caused by a lack of effectiveness of learning media and learning limited to only teaching materials (Aini et al., 2023; Alika & Radia, 2021). One way to overcome this is by developing innovative learning media. 21st-century learning requires teachers to be creative, create a conducive learning environment, and use innovative technology-based learning media (Alika & Radia, 2021; Silfiani et al., 2022). However, some teachers still have difficulty developing technology-based learning media, so they choose not to use it in the learning process.

The results of the interview with the fifth-grade teacher at SD 2 Sambung revealed that in the material regarding the application of Pancasila values, students still experienced learning difficulties, as seen from the results of the completeness score obtained at 69% with the minimum completeness value used being 70 and the learning completeness target being 80%. This is caused by a lack of student interest and motivation in reading the material. Using worksheets containing a lot of text with few pictures causes students

to be less interested in reading because it causes boredom. Additionally, using less varied technology-based learning media also makes students bored quickly. The learning media used in learning Pancasila Education is YouTube. However, using this learning media is limited due to the teacher's limited internet quota, so learning focuses more on using worksheets. Students prefer to hear the teacher's explanation without reading the material. Another obstacle was that teachers still needed help determining learning media appropriate to the material for implementing the Pancasila values. Therefore, it is necessary to develop innovative learning media that includes all material on the application of Pancasila values so that it can improve student learning outcomes.

Learning media is a tool that helps in the learning process to ensure information can be conveyed to students optimally (Aini et al., 2024). Integrating technology into learning media is a solution to developing innovative learning media (Bahri et al., 2021; Mutiaramses & Fitria, 2022). Innovative development of learning media aims to increase media variety and meet contextual needs to provide concrete learning experiences (Arifin et al., 2022; Weng et al., 2022). Based on this, one of the technology-based learning media that is interesting for students is digital comics. Digital comics are an innovative form of printed comics that provide more efficiency and convenience through the Internet. Comics that have simple and exciting storylines and images can attract students' attention in the learning process. Using digital comics can increase learning effectiveness and foster student motivation (Nafisyah et al., 2023; Nuraini et al., 2021; Putri et al., 2023).

Students are used to using technology, but they have never read comics digitally. One platform that can be used to read digital comics is Webtoon. A Webtoon is a visual representation of comics published via the web or applications whose users use the internet network. Webtoon can be a learning medium that positively impacts students, especially in increasing literacy, if it has a logical flow with interrelated and easy-to-understand sentences (Fauziah & Nasrullah, 2023; Rahma et al., 2022). The benefits of using Webtoons are that they have attractive images and stories presented, the text used is easy to understand, and they are accessible in various places and times, which supports the learning process and encourages the creation of innovations (Ghulam et al., 2023; Octaviana et al., 2021). Webtoons can be accessed via websites or applications downloaded on cell phones or other electronic devices. Several researchers state that Webtoons are effective because they provide visual illustrations and text that support the learning process and can be applied in various learning contexts (Cynthia et al., 2022; Ningrat & Mayasari, 2019; Prahastiwi & Kamil, 2023).

Previous research shows that a Webtoon is a digital comic platform that is effectively used as a learning medium for various subjects. Therefore, researchers used the Webtoon platform to develop digital comic learning media for material on applying Pancasila values. The product being developed can be an alternative so that the learning process is not tedious. There are two materials developed in this media, namely from teacher books and student books, as well as material for implementing Kudus City, which comes from valid and reliable news whose integrity can be checked by everyone. In previous research, digital comic media had less extensive material and was only based on teaching materials, thus affecting student learning outcomes. Therefore, it is necessary to develop effective digital comic media to improve student learning outcomes. This researched and development aimed to produced and tested the feasibility of used Webtoon-based digital comic media in material applying the valued of Pancasila principles. Apart from that, it is also to test the effectiveness of using Webtoon-based digital comic media in improving the learning outcomes of fifth-grade students. Through Webtoon-based digital comic learned media, students invited to utilize their free timed for learned activities. Learned was not only in the classroom but also outside the classroom, so students could learn while played and reduce boredom. Through this researched, researchers hoped to helped teachers developed educational innovations, especially in developed learned media.

## 2. Materials and Methods

The research and development method, or Research and Development (R&D), develops or improves an available product by going through stages and testing its effectiveness (Sugiyono, 2017). This researched used research and development with the waterfall model according to Somerville. The Waterfall development model consists of 5 stages, including 1) requirement analysis; 2) design; 3) implementation; 4) testing; and 5) maintenance (Kadri, 2018). This research is limited to stages 1 – 4, with research procedures for developing learning media products.

### *2.1. Requirement analysis*

The first stage includes analysis of interview results, needs questionnaires, learning media, school facilities, curriculum, learning materials, learning outcomes, and determining learning objectives. Syllabus analysis was also carried out to determine indicators of student learning outcomes.

### *2.2. Design*

In this second stage, the researcher designed a Webtoon-based digital comic design containing material preparation, character and background selection, and layout determination. The researcher also prepared teaching modules, pretest, post-test questions, and validation and response questionnaire instruments at this stage.

### *2.3. Implementation*

This third stage includes product realization activities starting from character creation, display, latching, and uploading. Researchers use Pixton and Canva software at this stage to realize the product design.

### *2.4. Testing*

This fourth stage includes validity testing by material and media experts before testing the product. After the product is declared valid, it is tested in a small class to determine its obstacles. After the product has been revised, the product is then tested in a large class. The small class and large class trials aim to find out whether the product being developed can improve learning outcomes in the research sample.

This research was carried out in class V with a sample of 29 students. The research location was SD 2 Sambung, Undaan District, Kudus Regency. The small class trial subjects consisted of 6 fifth-grade students with low, medium, and high levels of academic ability who were selected using purposive random sampling. The significant class trial subjects consisted of 23 class V students in the even semester of the 2024/2025 academic year on the material of applying the Pancasila values. The research period will run from December 2023 to February 2024 at SD 2 Sambung.

The types of data in this research are quantitative and qualitative data. Data collection techniques use interviews, validation sheets, and tests. Data collection instruments in this research were interview sheets, needs questionnaires, validation sheets, response questionnaires, and pretest post-test questions (20 cognitive questions). The questionnaire instrument in this research was given to media experts, material experts, teachers, and students to determine responses to media use. The data obtained was then analyzed using data analysis using the Formula 1.

$$P = \frac{f}{N}\ x\ 100 \quad (1)$$

Where P: Percentage figure; f: Score obtained; and N: Number of frequencies.

The first stage includes analysis of interview results, needs questionnaires, learning media, school facilities, curriculum, learning materials, learning outcomes, and

determining learning objectives. Syllabus analysis was also carried out to determine indicators of student learning outcomes.

Data analysis resulting from product validation by experts is used to describe the suitability of the media and analyzed using percentage and categorical descriptive techniques. Descriptive analysis is data analysis that describes or describes the data that has been collected as it is without concluding (Mukhtazar, 2020). The score resulting from the assessment using a classification questionnaire is divided into five criteria shown in Table 1.

Table 1. Validation Analysis Criteria

| Percentage (%) | Categorical |
|---|---|
| 85 - 100 | Very valid |
| 69 - 84 | Valid |
| 53 - 68 | Quite valid |
| 37 - 52 | Less valid |
| 20 - 36 | Invalid |

The media effectiveness test was carried out through comparative analysis with limited tests before (pretest) and after the use of Webtoon-based digital comic media (posttest) in one class, with a one-group pretest-posttest research design. Effectiveness testing assesses whether the product being developed is efficacious in improving student learning outcomes compared to previous products (Firnanda et al., 2023). The final pretest and posttest scores were then analyzed using a paired samples T-Test using SPSS 25.0 for Windows.

The media practicality test was carried out by analyzing the results of teacher and student responses when using Webtoon-based digital comic media. The scores resulting from the assessment using a questionnaire are classified into five criteria shown in Table 2.

Table 2. Media Practicality Analysis Criteria

| Percentage (%) | Categorical |
|---|---|
| 85 - 100 | Very practical |
| 69 - 84 | Practical |
| 53 - 68 | Quite practical |
| 37 - 52 | Less practical |
| 20 - 36 | Not practical |

## 3. Results

The results of this research are Webtoon-based digital comic learning media on applying Pancasila values to improve student learning outcomes. The media developed was declared feasible, practical and effective for use in the learning process. The result of the waterfall development stages are as follows.

### *3.1. Requirement analysis stage*

Before the requirement analysis, the initial stage was observation and interviews with class V teachers at SD 2 Sambung. Requirement analysis was carried out after observation, interviews, and distribution of needs questionnaires to teachers and fifth-grade students. The analysis of interviews and needs questionnaires shows an interesting problem for researchers: students' low interest in reading, which results in less-than-optimal learning outcomes. Apart from that, the use of learning media still needs to be more varied, namely only using module books and YouTube, so it is less attractive for

students, especially in Pancasila Education subjects, which contain a lot of reading. This shows the need to develop innovative media to support the Pancasila Education learning process.

Apart from that, researchers also obtained information about the facilities available at the school, such as a computer room that can support the learning process. Next, examine the curriculum and materials applied to learning. The curriculum used is the Merdeka curriculum. The primary material used is the application of the Pancasila principles contained in the learning outcomes of phase C of the Pancasila elements. The analysis results show that the selected research location has never used Webtoon-based digital comic learning media in teaching and learning activities.

### *3.2 Design stage*

Learning media designs are tailored to the needs of teachers and students. Activities at this stage are for researchers to design learning designs and compile materials that will be used in Webtoon-based digital comics. The preparation of this material aims to ensure that the learning media being developed is appropriate to the material to be delivered so that it can help students understand the learning material by the demands of learning outcomes (Dewi & Wiarta, 2021).

Researchers design media designs, including creating the appearance and selecting characters to be used in developing digital comics. The Webtoon-based digital comic that was developed has 158 image panels consisting of an opening, content regarding applying Pancasila values, evaluation questions and a closing. Components developed in Webtoon-based digital comics include a foreword, learning outcomes and learning objectives, a summary of Pancasila material, instructions for use, and material for applying the values of Pancasila principles 1 – 5, which are packaged in a comic storyline. These evaluation questions refer to learning achievements. These components help increase student understanding. These components are arranged in 8 episodes with the following material, namely (1) Epilogue= Contains an introduction to the comic; (2) Episode 1= Friendship Without Borders; (3) Episode 2= Respect others; (4) Episode 3= Cool diversity; (5) Episode 4= Democracy in school life; (6) Episode 5= Please help others; (7). Episode 6= Evaluation questions; and (8) Episode 7= Conclusion.

Next, the researchers developed the product starting from 1) creating a character design using Pixton software; 2) digital comic display design using Canva software consists of layout, background and adding characters; 3) add latting to digital comics by paying attention to font type, size and colour; 4) upload digital comic images to the Webtoon platform. This stage can be seen in Figure 1 about character creation process, Figure 2 about digital comic design process, Figure 3 about arrangement of lettering in digital comics and Figure 4 process of uploading a comics design to the Webtoon platform.

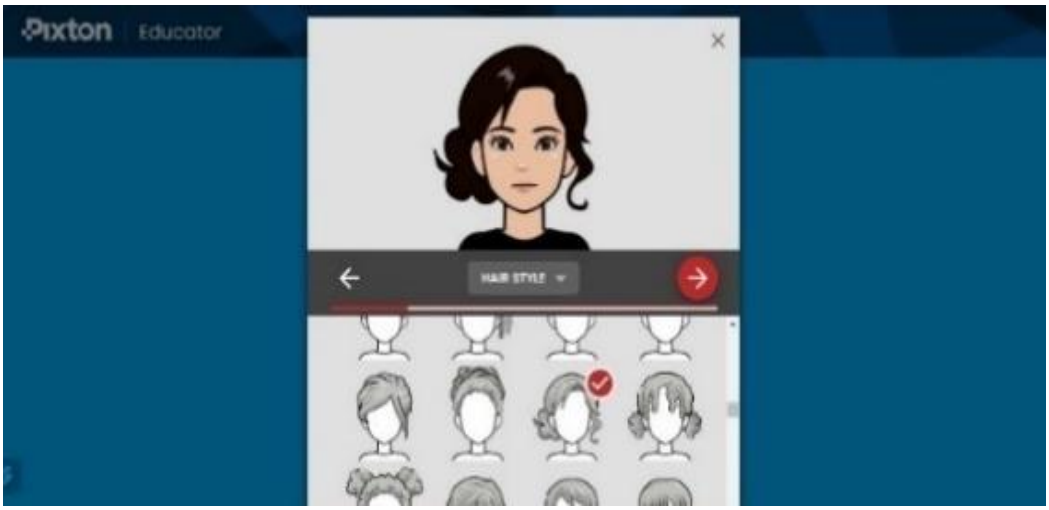


Figure 1. Character creation process

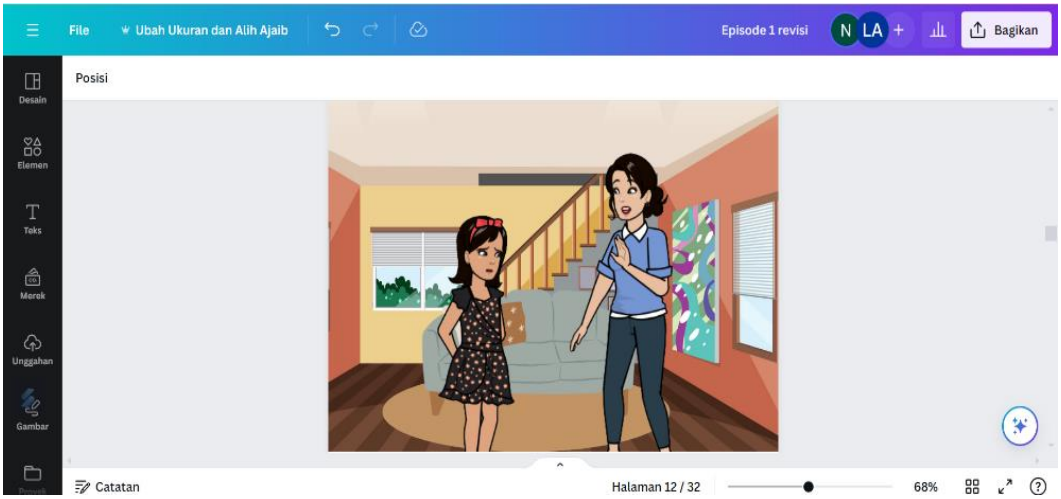


Figure 2. Digital comic design process

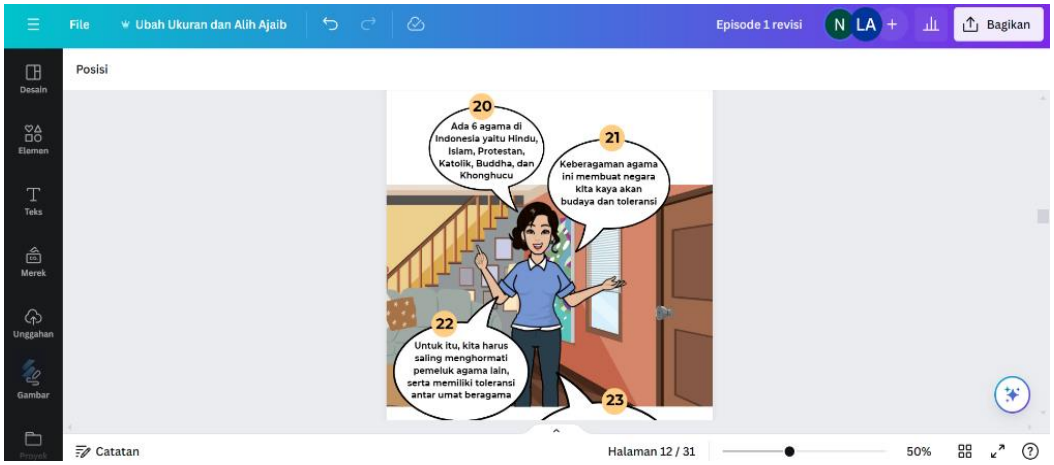


Figure 3. Arrangement of lettering in digital comics

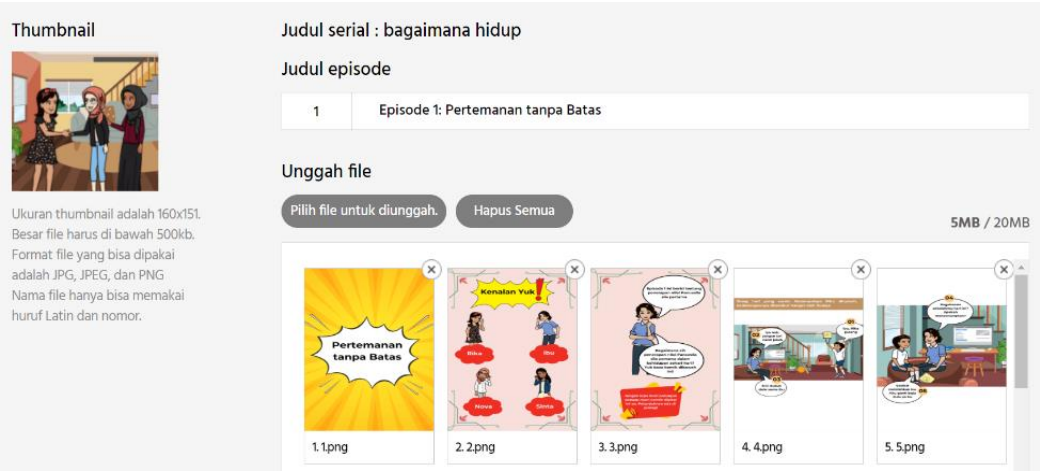


Figure 4. Process of uploading a comics design to the Webtoon platform

Apart from that, the researcher also prepares research instruments at this stage. The instrument developed was a questionnaire consisting of a validation sheet, practicality test sheet, and effectiveness test (pretest and posttest). Researchers also compiled teaching modules used during learning using Webtoon-based digital comic media.

*3.3 Implementation stage*

The learning media that had been developed was then carried out several tests by material experts, media experts, teachers and class V students at SD 2 Sambung.

*3.3.1 Validity test*

Two expert validators, material experts and media experts, carried out the validity test. The material expert validator is Galih Mahardika Christian Putra, S.Pd., M.Pd., is a lecturer in the Department of Elementary School Teacher Education at Universitas Negeri Semarang. Validation by material experts will be carried out on January 19 2024. Meanwhile, the media expert validator is Moh. Fathurrahman, S.Pd., M.Sn. is a lecturer in the Department of Elementary School Teacher Education at Universitas Negeri Semarang. Validation by media experts will be carried out on January 18, 2024. The results of the validation questionnaire analysis of Webtoon-based digital comics by material and media experts are in Table 3.

Table 3. Data from validation result of Webtoon-based digital comics

| Aspect | Percentage (%) | Categorical |
|---|---|---|
| Material validation | 94% | Very valid |
| Media validation | 93% | Very valid |
| Average | 94% | Very valid |

More specifically, each aspect has varying assessments. This is shown in Figure 5 and Figure 6, where each aspect has varying assessments by material and media experts.

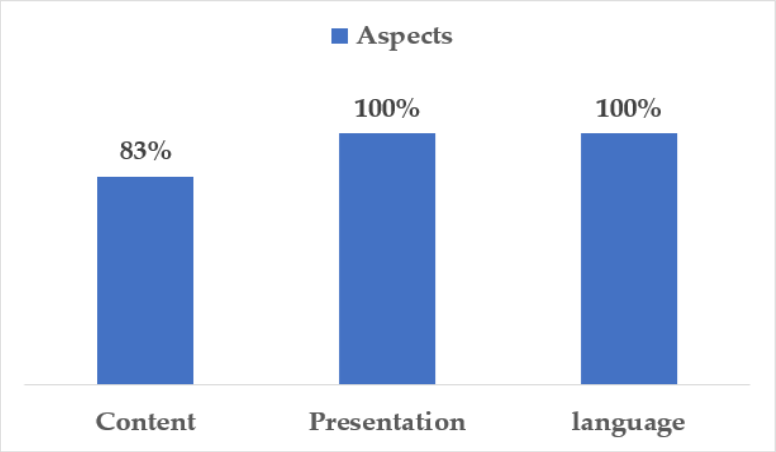


Figure 5. Material expert validity test result

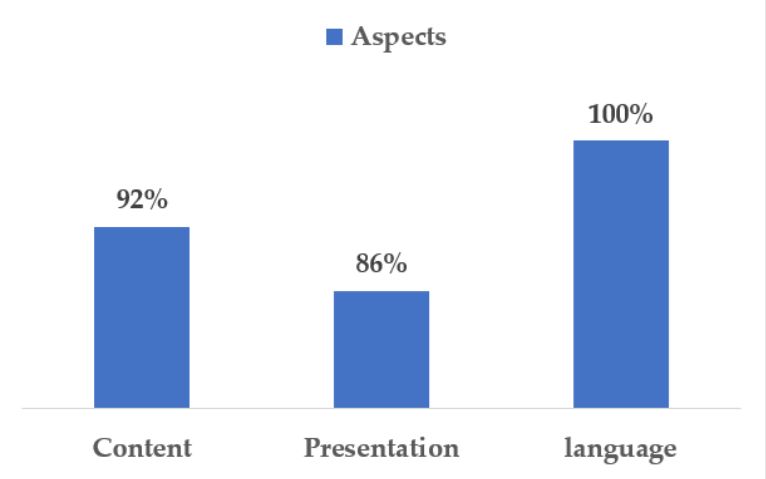


Figure 6. Media expert validity test result

Table 3 shows that the average validity by material and media experts is 94%, which is a very valid category. This shows that the Webtoon-based digital comic media developed is considered very suitable for use in learning because it meets the specified criteria.

Data from validity tests conducted by material and media experts stated that the product developed was deemed very suitable for use with minor revisions. There needed to be an improvement in suggestions from the media expert validator. Still, the material expert provided suggestions that the material for implementing the Pancasila values be linked to the implementation in the city where the research was conducted (Kudus) so that the scope of the material was more comprehensive and not limited to teaching materials. Material experts also suggested making evaluation questions more creative with various evaluation questions.

*3.3.2 Small Class Trial*

Small class trials aim to measure the effectiveness and practicality of the product being developed. Effectiveness testing is done through students' pretest and posttest results during the learning process. The data was then analyzed using a paired sample t-test. The results of the paired sample t-test are shown in Table 4.

Table 4. Result of the paired sample t-test on small class trials

| | Paired Differences | | | | | T | Df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | Lower | Upper | | | |
| Pair 1 Pretest – Posttest | -11.66667 | 5.16398 | 2.10819 | - 17.08593 | -6.24740 | - 5.5534 | 5 | .003 |

The results of the Paired Sample T-test show a Sig value. (2-tailed) = 0.003 < 0.05 (95% confidence), a significant difference exists between the average pretest and posttest scores. The use of Webtoon-based digital comics has a significant influence on student learning outcomes regarding the application of Pancasila values. A practicality test was also carried out at this stage using Webtoon-based digital comics. Practicality test results data were obtained from teachers and students through response questionnaires with valid categories. The results of the practicality test analysis by teachers and students are in Table 5.

Table 5. Data from the analysis of practicality tests in small class trials

| Aspect | Percentage (%) | Categorical |
|---|---|---|
| Teacher | 83% | Practical |
| Student | 80% | Practical |
| Average | 82% | Practical |

More specifically, each aspect has varying assessments. This is shown in Figure 7 and Figure 8, where each aspect has varying assessments by teachers and students. Table 5 shows that the average practicality test for teachers and students is 83% and 80% in the practical category. This shows that the Webtoon-based digital comic learning media developed is declared practical and suitable for use in the learning process so that it can be used in large class trials. There was an obstacle during the research, namely that students could not access digital comics because when they searched for the comic title on the Webtoon page, the comic did not appear. The solution to this obstacle is to access Webtoon-based digital comics via the URL link provided by the researcher.

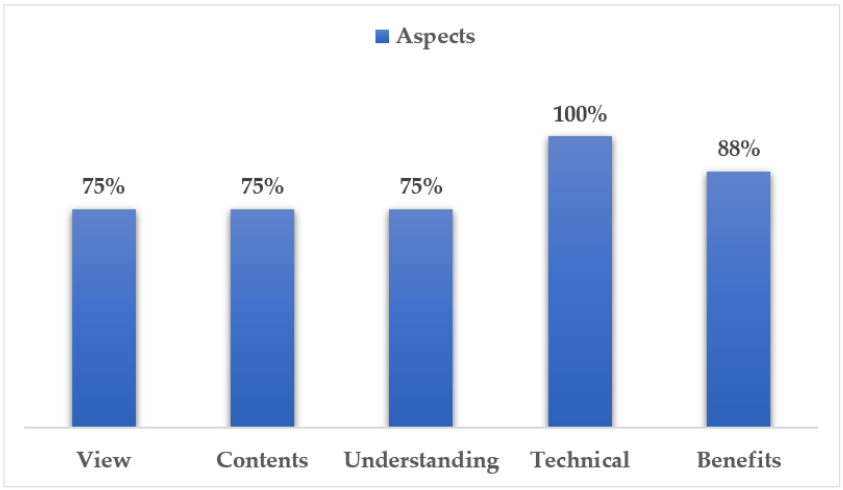


Figure 7. Results of practical test analysis by teachers in small class trials

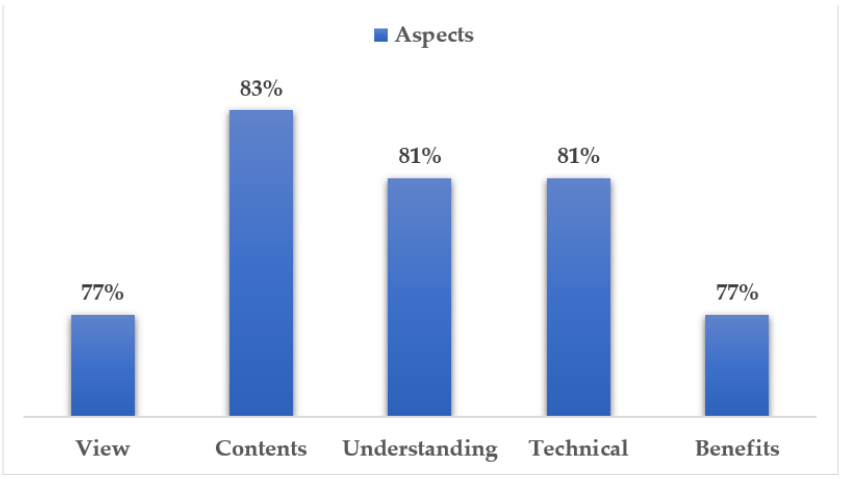


Figure 8. Analysis results of practicality tests by students in small class trials

At the implementation stage, two improvements were made to the digital comic media being developed. The first improvement is implementing the Pancasila values contained in Kudus, namely in episodes 1, 2, 3 and 5. Episode 1 adds to the form of tolerance in the city of Kudus, namely regarding the Kudus Tower Mosque. Episode 2 is working together to collect donations with communities in Kudus. Episode 3 is about buying domestic products such as *jenang* snacks, typical of Kudus. Episode 5 appreciates the works of art found in the town of Kudus. The second improvement is revising evaluation questions with varied questions in multiple-choice, true/false, short answers and descriptions. The revised result is presented in Table 6.

Table 6. Revision of digital comic learning media

| Before | After |
|---|---|
|  |  |

| Before | After |
|---|---|
| There are no cultural elements of Kudus City | Adding cultural elements of Kudus City, namely the history of the Kudus Tower Mosque |
|  |  |
| There are no scenes that emphasize the humanitarian activities in Kudus City | One of the humanitarian activies in Kudus City will be added through community forums |
|  |  |
| There are no cultural elements of Kudus City | Adding a cultural element of Kudus City, namely Jenang, a typical snack of Kudus City |
|  |  |
| There are no cultural elements of Kudus City | Adding a cultural elements of Kudus City, namely the form of local wisdom found in the Piji Wetan Cultural Village |
|  |  |
| The evaluation questions are only in the form of multiple-choice quistions | The evaluation questions were in the form of multiple choice with a total of 5 questions, “true/false” questions totalling 3 questions, short-form questions totalling 5 questions, and description questions totalling 2 questions |

### 3.4. Testing stage

After going through the improvement stage, the media can be used in further testing, namely trials on a broader scale (large class trials). Data from the effectiveness test were analyzed using the paired sample t-test. Effectiveness data was obtained from students' pretest and posttest results during the research in large class trials, with the results being effectively used in learning. Data from the paired simple t-test are presented in Table 7.

Table 7. Result of the paired sample t-test on large class trial

| | Paired Differences | | | | | T | Df | Sig (2-tailed ) |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | Lower | Upper | | | |
| Pair 1 Pretest – posttest | -10.21739 | 5.32538 | 1.11042 | -7.91452 | -12.52026 | -9.201 | 22 | .000 |

The results of the paired sample t-test show the Sig value. (2-tailed) = 0.000 < 0.05 (95% confidence), so there is an increase in the average pretest and posttest. Student learning outcomes using Webtoon-based digital comic media are better than student learning outcomes before using Webtoon-based digital amusing media. This shows that Webtoon-based digital comic media is effectively used in the learning process. At this stage, teachers and students also tested the practicality of using Webtoon-based digital comics through a response questionnaire in the efficient category. The results of the practicality test analysis by teachers and students are in Table 8.

Table 8. Data from the analysis of practicality tests in large class trials

| Aspect | Percentage (%) | Categorical |
|---|---|---|
| Teacher | 90 | Very practical |
| Student | 82 | Practical |
| Average | 86 | Very practical |

More specifically, each aspect has varying assessments. This is shown in Figure 9 and Figure 10, where each aspect has varying assessments by teachers and students.

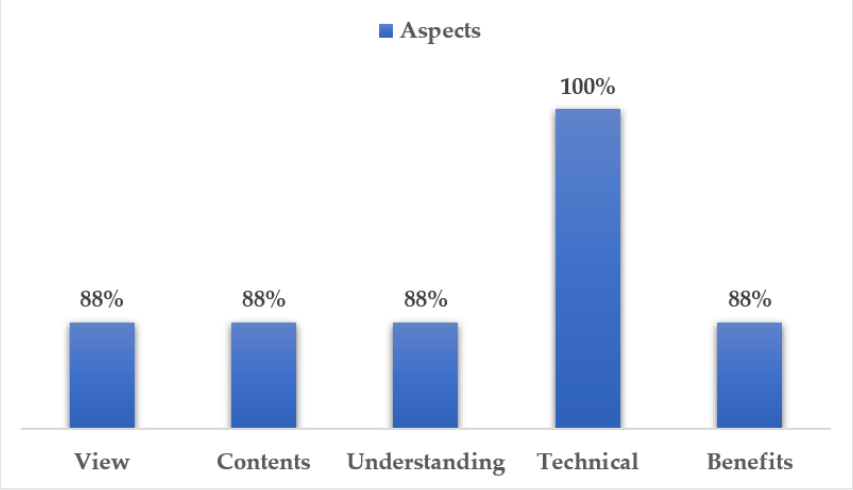


Figure 9. Practicality test results by teachers in large class trials

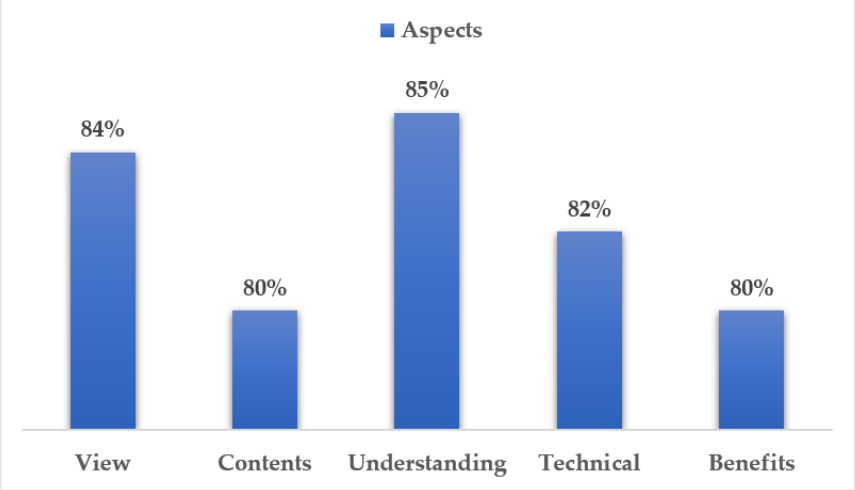


Figure 10. Results of practicality tests by students in large class trials

Based on Table 8, the average practicality test by teachers and students is 86% in the efficient category. This shows that Webtoon-based digital comic media, which has gone through the revision stage, is very suitable for learning. Based on the validity and practicality tests, learning media development is feasible and practical to use in the Pancasila Education learning process regarding applying Pancasila values. Based on the effectiveness test, using Webtoon-based digital comic media effectively improves student learning outcomes.

## 4. Discussion

This research produces Webtoon-based digital comic products that can improve Pancasila education learning outcomes. The development of Webtoon-based digital comics was developed through 4 Waterfall stages. The initial activity before product development is conducting a needs analysis by teachers and fifth-grade students. Before the product is given to students, researchers carry out a validity test on the product being developed. Product validity testing is carried out by experts who aim to determine how feasible the product that has been developed is and provide advice on the product being developed (Rozhana et al., 2023). Two expert validators carried out the validity test of the Webtoon-based digital comic, with the score reaching the "Very Valid" category. The material expert validation results reached 83.3% in the first aspect (content) and 100% in the second and third aspects (presentation and language). Media expert validation results reached 92% in the first aspect (language), 86% in the second aspect (graphics), and 100% in the third aspect (technical). Based on this, it can be stated that Webtoon-based digital comics are suitable for use in the teaching and learning process with slight revisions to the content of the material because most of the assessment aspects have met the suitability of the product being developed, including aspects of content, presentation, language, graphics and technical aspects.

The content aspect states the suitability of the content of the material and evaluation questions with the learning outcomes and objectives in the material on applying Pancasila values. The presentation aspect states that Webtoon-based digital comics are relevant, the chronology of the material is precise and systematic, and the presentation is equipped with contextual images and is easy to understand. The language aspect states that the use of language is in accordance with improved spelling, that language does not give rise double meanings, is easy to understand, and is appropriate to students' intellectual development. The graphical aspect states that the background selection is appropriate, the layout is accurate, the image composition is fair and transparent, and the use of letters' size, type, and color is consistent and attractive. The technical aspect states the ease

of use of learning media and being effective for learning. The ease of using media can eliminate students' boredom so that the learning process can occur more effectively (İlhan et al., 2021; Putri & Ristiono, 2021). Students gain a comprehensive understanding of learning concepts through an optimal learning process. Learning using media makes it easier for teachers to convey information, so learning can run optimally and improve learning outcomes because learning messages are given interestingly, clearly, sequentially, and adapted to student needs (Yonanda et al., 2019). Several studies state that using digital comics can create learning innovations that are more effective in improving learning outcomes (Praptiwi et al., 2021; Rahayuningsih & Setiawan, 2023; Rina et al., 2020). This shows that using digital comics in learning is effective and optimal.

Learning media is practical for use in the learning process. The results of the practicality test by teachers and students stated that the use of learning media after revision was categorized as "Very practical" in all aspects. The teacher's response was categorized as very practical, with practical results reaching 88% in the first, second, third, and fifth aspects (appearance, content, understanding, and benefits) and 100% in the fourth aspect (technical). Student responses were categorized as very practical, with practicality results reaching 84% in the first aspect (appearance), 80% in the second aspect (content), 85% in the third aspect (understanding), 82% in the fourth aspect (technical), and 80% in the fifth (benefits). Visual media or unique graphic illustrations of the studied material can help improve students' cognitive abilities (Malahilla et al., 2023). Webtoon-based digital comic learning media is designed with a combination of text and colored images, thus enabling a better depiction of real situations in supporting students' understanding of concepts than designs in text form. Combining text and images can help students understand the content of comics because the text provides a more precise understanding than using images alone (Octaviana et al., 2021). Language related to words and dialogue is adjusted to the student's cognitive level (Trimurtini et al., 2021). The learning process that uses media has an impact on achieving student learning outcomes. The use of Webtoon-based digital comic media in the learning process makes students more active, happy, and motivated to participate in the learning process (Darmayanti & Abadi, 2021). This is because interactive learning media allows students to participate directly in the learning process, so it positively impacts students' cognitive knowledge (Hakim et al., 2022; Mulyani et al., 2023).

Webtoon-based digital comic learning media is a printed funny innovation transformed into a Webtoon platform. Webtoon is a digital comic that can be used as an interactive learning medium that increases students' enthusiasm and comfort in reading. This is due to its ease of use compared to printed comics, with material adapted to students' cognitive development. This is due to its ease of use compared to printed comics, with material adapted to students' cognitive development. The transformation is carried out through the Webtoon platform because of its ease of use, which can be accessed anywhere and at any time, so it is hoped that the learning process is not limited only to the school environment but can take place outside the school as well. What differentiates this digital comic from other digital comics is that the material is not only guided by the module book but also connected to the implementation in the city of Kudus. Apart from that, this digital comic media is equipped with various evaluation questions, which help improve students' cognitive abilities and stimulate critical thinking. These evaluation questions aim to improve learning outcomes so that students do not feel bored while studying (Prasetyo et al., 2022; Septia et al., 2023). Positive responses show that digital comics have broader coverage and are very easy to use anywhere and anytime. Teachers can share them via WhatsApp so that students can learn while playing and still achieve learning objectives (Aprillia et al., 2022; Fitria et al., 2023). This shows that Webtoon-based digital comic media development has fulfilled the aspects of feasibility, practicality, and effectiveness in the learning process, thereby influencing student learning outcomes.

The thing that must be considered when using Webtoon-based digital comic media is that you must use an internet network when accessing the Webtoon platform. Webtoon cannot be accessed if there is no internet connection. Researchers provide a solution in this

case readers can download the Webtoon application and then download the episode they want to read. Without an internet connection, only downloaded episodes can be accessed. In future development research, Webtoon-based digital comic media can be enriched with audio support to achieve more optimal development result.

## 5. Conclusions

The results of the development of Webtoon-based digital comic learning media on the material of applying Pancasila values using the waterfall model are suitable for use. The validation results from material and media experts reached the "Very valid" category, so they are suitable for use. Teachers and students also stated that digital comic media was "Very practical" to use in the learning process regarding applying Pancasila values. There is a significant difference between student learning outcomes before and after using Webtoon-based digital comic media, $T(22) = 9.20$, $p < 0.05$. The development of digital comic learning media in this research is limited to one material, namely the application of the values of Pancasila principles. It is recommended that future researchers expand the content of the material in digital comics so that it is not limited and has wider coverage. This is expected to bring innovations in learning and improve student learning outcomes in Pancasila education subjects.

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