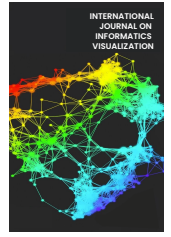




INTERNATIONAL JOURNAL ON INFORMATICS VISUALIZATION

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Canva-based Animation Comic Video Media in Informatics Learning at SMP Negeri 14 Padang

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Abstract—This research addresses challenges in conventional learning media, limited facilities, and suboptimal use of technology, which hinder student material mastery, motivation, and independence. The study aims to develop and validate Canva-based animated comic video learning media for Informatics subjects in class VIII at SMP N 14 Padang. Using the Research and Development (R&D) method with a 4D development model—define, design, develop, disseminate—primary data were collected from validators, teachers, and students. Descriptive and inferential analyses were employed to evaluate the validity and practicality of the media. The learning media achieved high validity scores: 0.963 for media design and 0.975 for material content. Expert evaluations highlighted the media's effective visual design, systematic content presentation, and alignment with curriculum objectives. Practicality was confirmed with average scores of 97.04% from teachers and 93.14% from students, who appreciated its ease of use, accessibility across devices, and engaging, interactive features that support both independent and collaborative learning. This study underscores the importance of integrating technology into learning media to enhance education quality. Canva-based animated comic videos are not only applicable to Informatics but also have potential for adaptation to other subjects. The combination of visual, audio, and interactive elements fosters engaging, flexible, and impactful learning experiences for students. Future research could explore AI integration for personalized learning and broader testing across diverse student groups and subjects. This research provides a foundation for developing innovative, accessible, and inclusive technology-based learning tools to improve education quality in the digital era.

Keywords—Animated comic video; Canva; learning media; informatics.

Manuscript received 20 Jul. 2024; revised 26 Sep. 2024; accepted 6 Dec. 2024. Date of publication 31 Jan. 2025.
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I. INTRODUCTION

Education today in Indonesia is not only considered as a public service provider, but also as a productive investment that supports growth in various fields and development sectors [1], [2], [3]. Education is not only an indicator of a nation's progress, but also plays an important role in determining a country's progress [4], [5]. The concept of "Freedom to Learn" emphasizes innovation and change as the core, aiming to create students with skills such as critical thinking, creativity, innovation, as well as communication and collaboration skills that are important in the era of the industrial revolution 4.0 [6], [7]. Teachers should not treat students uniformly, but should guide them according to individual talents and interests, similar to planting rice which cannot be expected to become corn [8], [9], [10]. This means

that the learning environment must allow students to feel valued and have freedom in the learning process. However, many teachers currently do not adequately consider students' uniqueness, which causes boredom, lack of productivity, and less than optimal learning independence. They often focus too much on delivering the material without paying adequate attention to students' actual achievements and outcomes.

The Merdeka Belajar curriculum emphasizes results and project-oriented learning, with a focus on the Pancasila student profile and basic competencies such as literacy and numeracy [11], [12]. Teachers need to adopt various media in the Independent Curriculum to make learning more interesting for students [13], [14], [15]. Research shows that the use of video-based teaching materials is practical and effective as a learning resource in the learning process [16], [17], [18], [19].

The use of animated video-based learning media, especially those developed with the Canva application, has proven effective in increasing student motivation and learning participation [20], [21]. Research shows that this media has a high level of validity and gets a positive response from students in terms of satisfaction with learning [22], [23], [24].

Assessment of student learning achievements in the Informatics subject at SMP Negeri 14 Padang shows that the majority of students have not achieved the expected learning completeness. Of the total 64 students from classes VIII.3 and VIII.7, 46 students require remediation in various aspects of learning. Observations also reveal that the use of conventional learning media such as blackboards and teaching modules is still dominant, lacking the variety needed to motivate students. This results in a lack of interest in learning and limited access to innovative learning materials, especially for students with an audiovisual learning style.

As a solution, the use of Canva-based animated comic media is recommended to overcome this challenge. This is expected to increase the interactivity, visualization and attractiveness of learning as well as provide better support for students' individual learning needs. Using the Canva platform also makes it easier for teachers to create interesting content that suits learning needs. Thus, the transition to Canva-based animated comic media not only brings variety in learning approaches but also optimizes teaching potential through a medium that is innovative and accessible to all students.

This research identifies several challenges in education, such as a lack of variety in learning approaches which causes monotony and lack of stimulation of student interest, as well as limitations in learning formats that focus too much on written reading. The focus of the research is to develop learning media in the form of animated comic videos for class VIII Informatics subjects at SMP Negeri 14 Padang, with the aim of increasing learning interactivity and supporting student understanding. The problem formulation includes how to produce, evaluate the validity, practicality and effectiveness of this media, as well as its implementation in schools. The aim of the research is to improve students' understanding of Informatics material with this innovative media. The benefits include increased theoretical understanding of learning media and practical benefits for teachers and students. Product specifications include the development of flexible Canva-based animated comic videos accessed via the internet, focusing on computer systems and hardware. The assumptions and limitations of the study include one particular class and subject, as well as reliance on internet infrastructure and students' basic knowledge of computers. Operational definitions of these terms were used as the basis for the research methodology and results.

II. MATERIALS AND METHOD

The subject of this research is the development of animated comic video-based learning media for informatics subjects, especially computer system elements and computer hardware material in class VIII. The population consists of eight classes (VIII.1 to VIII.8), with sample selection using the Cluster Random Sampling method. The experimental class chosen was VIII.3, totaling 32 people, and the control class was VIII.7, totaling 32 people. This research will focus on these

two classes to evaluate the effectiveness of the learning media developed.

This research adopts the type of research and development (R&D) to create specific products and test their effectiveness, as explained by Sugiyono [25]. The development model chosen is the four-D model (Define, Design, Develop, and Disseminate), which is structured systematically and in accordance with the research background problem [26]. The main aim of implementing the four-D model is to develop valid, practical and effective learning media in increasing students' interest in learning.

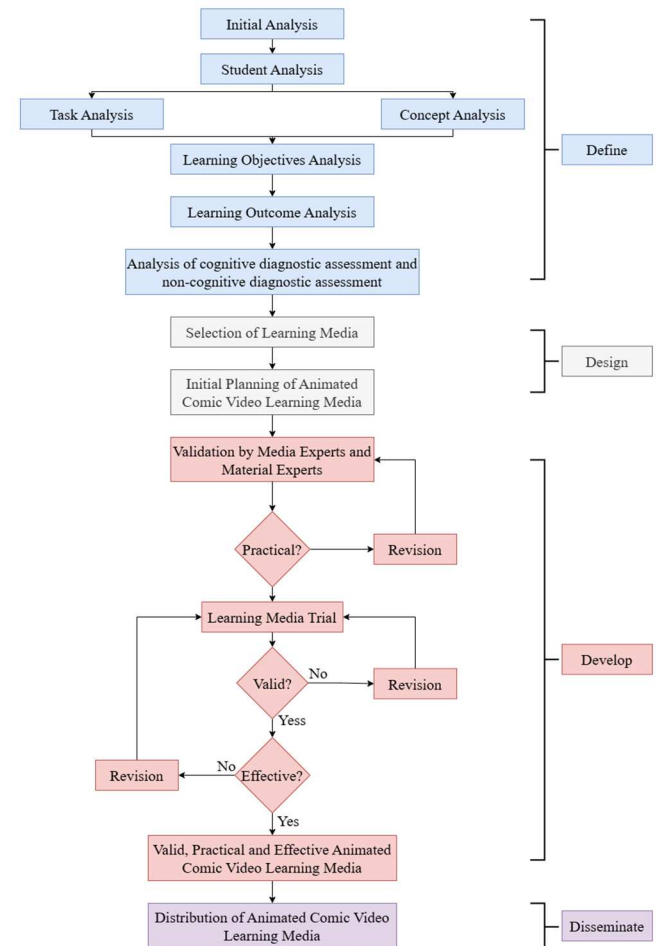


Fig. 1 The 4-D Model Research Design

Fig.1 above illustrates the research flow based on the 4-D Model, which consists of four main stages: Define, Design, Develop, and Disseminate [27], [28].

A. Define Phase

The Define stage in this research aims to understand the learning conditions and analyze the needs for developing Canva-based animated comic video learning media for Informatics subjects. The focus is on identifying fundamental issues, such as monotonous conventional teaching methods, lack of media variation, and gaps in students' learning styles. This stage involves preliminary-final analysis, student analysis, task analysis, concept analysis, and learning objectives analysis. The results of the needs analysis are presented in the following table.

TABLE I
NEEDS ANALYSIS FOR DEVELOPING CANVA-BASED ANIMATED COMIC VIDEO
LEARNING MEDIA

Aspect	Analysis Result	Description
Teaching Methods	70% of teachers use lecture-based methods without interactive supporting media.	Learning tends to be monotonous and lacks innovation.
Variety of Learning Media	60% of teachers rely only on textbooks and basic PowerPoint presentations.	Learning media is less engaging and lacks variety.
Student Boredom Levels	65% of students feel that learning is monotonous and uninteresting.	Innovation in media is needed to increase student enthusiasm.
Student Understanding Levels	Only 40% of students understand the material well using conventional media.	Learning effectiveness needs improvement.
Learning Styles	50% visual, 30% auditory, 20% kinesthetic.	Media should incorporate visual, auditory, and interactive activity elements.
Interest in Interactive Media	85% of students are interested in media featuring illustrations, audio, video, and evaluation.	Canva-based media can meet this demand.
Access to Technology	90% of students have Android devices to support digital learning.	Media needs to be designed to be compatible with Android devices.
Understanding Computer Systems	Average pretest score: 55 (Scale: 100).	Students' understanding is low; the material is difficult to grasp without engaging support media.
Learning Motivation	Average score: 60 (Scale: 100).	Students' motivation is low, requiring media that can increase enthusiasm.
Difficulty in Tasks	70% of students find it difficult to analyze computer component functions.	Material needs to be explained more simply and interactively.
Concepts Difficult to Grasp	CPU, RAM, and how the computer system works.	These elements require clearer and more concrete visualization.
Response to Canva Media	90% of students find Canva-based media more engaging; 85% find it easy to use; 80% say it supports independent learning.	Canva-based media is expected to enhance motivation, understanding, and learning flexibility.

The analysis results indicate that the current learning media are not yet effective in enhancing students' motivation and understanding. Therefore, the development of Canva-based media is proposed, presenting materials with illustrations, audio, videos, evaluations via Quizizz, and integration with Google Sites. This media is expected to help students grasp the material in an engaging, flexible, and in-depth manner, particularly on the Computer System topic. Utilizing Android

devices, the media is designed to be accessible anytime and support both independent and collaborative learning.

B. Design Phase

1) *Preparation of Test Standards:* This step aims to design test instruments to measure students' abilities before and after learning, as well as to evaluate the effectiveness of the developed learning media. The tests, consisting of a pretest and posttest in multiple-choice format, are structured based on the learning outcomes for the Computer System element in the Informatics subject. These tests serve not only as evaluation tools but also as a means of comparison between students who use the Canva-Based Animated Comic Video learning media and those who do not.

2) *Media Selection:* The Canva-Based Animated Comic Video learning media was chosen as the primary medium due to its ability to present material in an engaging and interactive manner. This choice leverages the Canva application, which enables the integration of various platforms such as PowerPoint, Voice Maker, Google Forms, YouTube, and Google Sites as e-learning tools. By combining text, images, audio, and video, this media is designed to be accessible via Android devices, laptops, and computers, supporting flexible and effective learning. The developed materials are presented through the Canva platform, offering vibrant colors and appealing illustrations that can enhance students' interest in learning.

3) *Format Selection:* The chosen format for developing this media includes structuring the material based on learning objectives (indicators), presenting instructional content in the form of educational videos, and conducting evaluations using the Quizizz application. This format is designed to create an engaging learning experience and help students more easily understand concepts in the Informatics subject.

4) *Initial Design:* The initial stage begins with crafting an engaging narrative as the foundation for the animated comic video. This narrative is designed to establish a dynamic and emotional storyline. Once the narrative is complete, the next step involves designing cartoon characters to support the storytelling. These characters are carefully crafted with attention to both visual details and personality traits, ensuring they effectively convey the learning message.

5) *Final Design:* The final design focuses on developing the framework for the learning media interface, accessible through Google Sites. The website features a main homepage with several menus: Home, Profile, Modules, Videos, Evaluation, and Reflection. The Modules menu presents learning materials from session 1 to session 8, while the Videos menu contains a collection of animated comic videos covering topics such as computer generations, hardware, software, brainware, number systems, embedded systems, logic gates, and operating systems. These videos are accessible via links to YouTube. The Evaluation menu provides links to learning evaluations using Quizizz, and the Reflection menu includes activities for learning reflection. With this design, the learning media is expected to effectively support students in both independent and collaborative learning.

C. Development Phase

After completing the design stage, the next step is the development stage. Fig. 2 showcases the interface of the Canva-Based Animated Comic Video learning media.

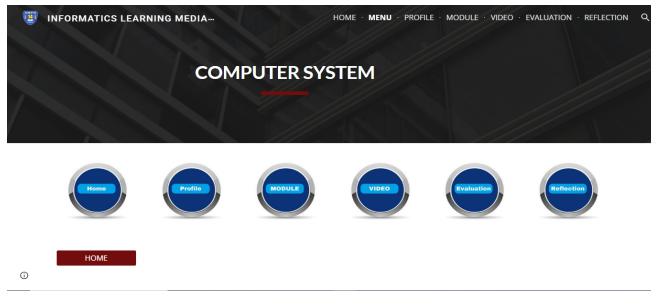


Fig. 2 Canva-Based Animated Comic Video Learning Media

The objective of this stage is to create a Canva-based animated comic video learning media that is valid, practical, and effective. At this stage, a validity test is conducted by involving assessments from media expert validators and material expert validators. Next, a practicality test is carried out with the participation of subject teachers and students in using Canva-based animated comic video media. The final stage is the effectiveness test, which measures its impact on students' learning outcomes.

1) *Validity Test*: Before being tested on students, the product was evaluated by two material experts from SMP N 14 Padang teachers and two media experts from UNP engineering department lecturers. The instruments can be seen in Table 2 and Table 3.

TABLE II
MATERIAL EXPERT VALIDITY ASSESSMENT INSTRUMENT GRID

No	Aspect	Indicator	Item Number
1	Material Quality	Completeness of material in the media	1-3
		Systematic preparation of material	4-5
		The language used in writing the material	6-7
2	Learning Quality	Suitability to learning objectives	8-9
		Increased learning motivation	10-11
		Increased learning independence	12
3	Quality of Interaction	Text is easy to read	13-14
		Instructions and description	15-17
4	Display Quality	Use of animation	18
		Use of color and navigation buttons	19-24
		Use of music (sound)	25

TABLE III
GRID OF MEDIA EXPERT VALIDITY ASSESSMENT INSTRUMENTS

No	Aspect	Indicator	Item Number
1	Visual	Text dimensions	1-3
		Choice of writing color	4-6
		Visual and image quality	7-8
		Image and content layout	9-10
2	Media Design	Ease of use of media	11-13
		Effectiveness of media navigation	14-15
3	Media Utilization	The usefulness of media in learning	16-20

2) *Practicality Test*: Next, a practicality questionnaire was used which included perceptions and suggestions from

teachers and students. The questionnaire aims to assess the practicability of the animated comic video-based learning media that has been developed. The instruments can be seen in Table 4 and Table 5.

TABLE IV
PRACTICALITY ASSESSMENT INSTRUMENT GRID FOR TEACHERS

No	Aspect	Indicator	Item Number
1	Ease of Use	Use in Operation	1-2
		Use in independent learning in students	3
		Understanding on material	4-6
2	Effectiveness of Learning Time	Preparation for use	7-8
		Utilization in the learning process	9-10
3	Media Use	Ease of use in the learning process	11-12
		Interest in media use	13-14

TABLE V
GRID OF PRACTICALITY ASSESSMENT INSTRUMENTS FOR STUDENTS

No	Aspect	Indicator	Item Number
1	Ease of Use	Use in Operation	1-2
		Understanding on material	3-4
2	Effectiveness of Learning Time	Use in understanding the material	5
		Utilization in the learning process	6-8
3	Media Use	Interest in media use	9-10
		Ease of use in the learning process	11-12
		Increasing student interest in learning and learning independence	13-14

The technique used to analyze data is qualitative descriptive analysis. Analysis of learning media techniques is carried out to assess whether the data resulting from the validation of the learning media that has been created can be continued to the next stage or not. and Practicality of a media is used to measure how practical the learning media that has been created is [29]. The assessment in the questionnaire uses a Likert scale with five answer options, namely SS, S, R, KS, and TS.

D. Dissemination Phase

After the Canva-Based Animated Comic Video learning media has undergone the validation and practicality tests, the dissemination stage is conducted. This learning media is declared ready for use by teachers and students in Informatics subjects as it meets the required standards of validity, practicality, and effectiveness. The media is also adopted for application in other classes with similar subjects and promoted to other schools offering Informatics classes, such as grade VIII in both public and private junior high schools under the MGMP in Padang City.

III. RESULTS AND DISCUSSION

A. Canva-Based Animated Comic Video Learning Media

This research resulted in the development of a Canva-Based Animated Comic Video learning media designed to improve the quality of learning in Informatics subjects, particularly on the Computer System topic. This learning media combines various interactive elements, such as text, images, videos, and audio, presented through the Canva application. The media is also integrated with supporting platforms, including PowerPoint, Voice Maker, Google Forms, Quizizz, and Google Sites. Fig. 3 illustrates the

interface of the Canva-Based Animated Comic Video learning media.

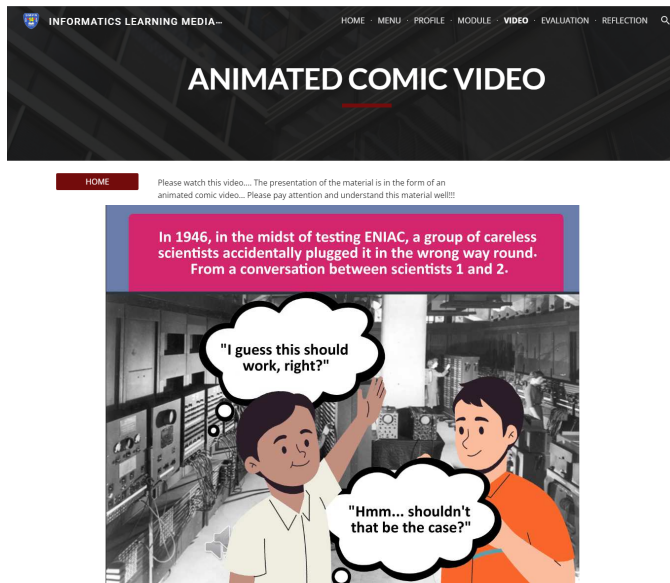


Fig. 3 Display of Canva-Based Animated Comic Video Learning Media

This learning media offers several advantages. First, it is designed to capture students' attention through interactive visual illustrations and appealing colors. Second, it provides flexibility in learning as it can be accessed through various devices such as Android smartphones, laptops, and PCs. Third, it supports both independent and collaborative learning by presenting systematic materials, including animated comic videos arranged with engaging storylines and narratives relevant to the learning topics.

The learning materials presented in the Canva-Based Animated Comic Video cover eight main topics relevant to the Computer System element: Computer Generations, Hardware, Software, Brainware, Number Systems, Embedded Systems, Logic Gates, and Operating Systems. These materials are systematically designed to provide students with a comprehensive understanding, combining visual elements and interactive narratives tailored to the needs of learning in the digital era.

B. Validation of Media and Materials

Based on assessments from media and material experts, validation tests are used to determine whether the learning media that has been created is appropriate. Validators who are experts in the field of media and materials fill out the instrument to determine the results of the validity assessment. The research findings show the feasibility of the learning media developed. Table 6 and Fig. 4 display an overview of validation findings from media specialists on several aspects of learning media.

The results of this validation show that the media is considered valid in the visual aspect with a value of 0.988 (≥ 0.667), as well as in the media design aspect with a value of 0.925 (≥ 0.667). Apart from that, in the aspect of media utilization, this media is considered valid with a value of 0.975 (≥ 0.667). All assessments of media validation aspects are included in the valid category. Apart from that, the

average validity value in media validation is 0.963 (≥ 0.667), which is also included in the valid category.

TABLE VI
MEDIA EXPERT VALIDATION RESULTS

No.	Assessment Aspects	Average Validator Value	Category
1	Visual	0.988	Valid
2	Media Design	0.925	Valid
3	Media Utilization	0.975	Valid
Average		0.963	Valid

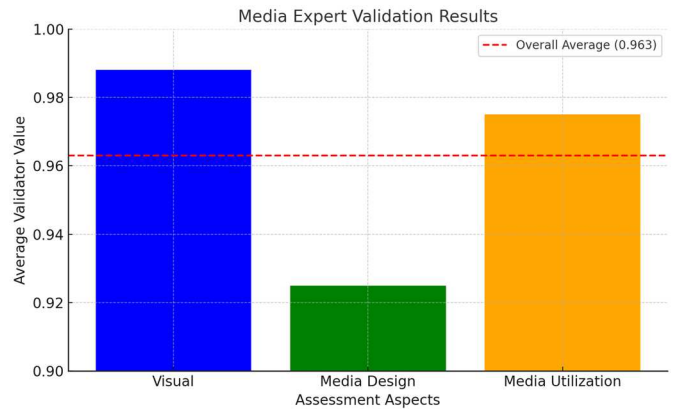


Fig. 4 Media Expert Validation Results

Material experts validate several aspects such as material quality, learning quality, interaction and appearance. Validators evaluate the material presented in this Canva-based animated comic video learning media and provide an assessment. The assessment of each aspect is analysed using the Aiken's V statistical formula. The results of this analysis produce a validation value for the product that has been designed. Validation recapitulation is compiled from evaluation of material aspects in learning media, as listed in Table 7 and Fig.5.

TABLE VII
MATERIAL VALIDATION RESULTS

No.	Assessment Aspects	Validation Value	Category
1	Material Quality	0.964	Valid
2	Quality of learning	1,000	Valid
3	Quality of Interaction	1,000	Valid
4	Display Quality	0.938	Valid
Average		0.975	Valid

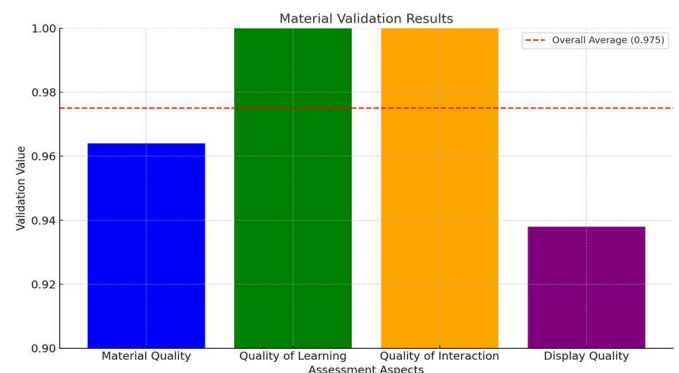


Fig. 5 Material Validation Results

This validation shows that the media is considered valid in terms of material quality with a value of 0.964 (≥ 0.667),

learning quality with a value of 1.000 (≥ 0.667), interaction quality with a value of 1.000 (≥ 0.667), and display quality with a value of 0.938 (≥ 0.667). All aspects of the validation of this material fall into the valid category. Apart from that, the average validity value in material validation is 0.975 (≥ 0.667), which is also included in the valid category.

C. Practicality

Furthermore, the results of the practicality test are based on the teacher's response to the Canva-based animated comic video learning media that has been developed. These practicality results show that the media is considered very practical in terms of ease of use with a value of 97.78%, effectiveness of learning time with a value of 96.67%, and use of the media with a value of 96.67%. Evaluation of every aspect of the practicality of the teacher's response falls into the very practical category. The average practicality score from the teacher response questionnaire was 97.04%, which is also included in the very practical category. Thus, based on the teacher's response to the media developed, this media can be categorized as very practical. The results of the teacher response questionnaire data are shown in Table 8 and Fig.6.

TABLE VIII
RESULTS OF TEACHER PRACTICALITY

Indicator	Percentage %	Criteria
Ease of Use Aspect	97.78	Very Practical
Aspects of Effectiveness of Learning Time	96.67	Very Practical
Aspects of Media Use	96.67	Very Practical
Average Percentage (%)	97.04	Very Practical

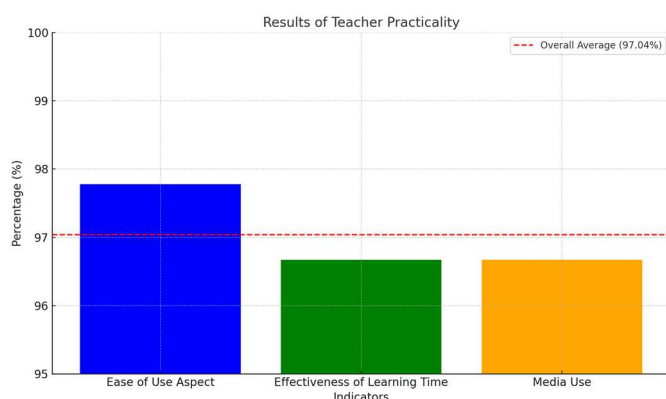


Fig. 6 Results of Teacher Practicality

Canva- based animated comic video learning media that has been developed. This media is considered very practical in terms of ease of use with a score of 94.06%, effectiveness of learning time with a score of 92.97%, and use of the media with a score of 92.40%. The evaluation of each aspect of the practicality of the student's response falls into the very practical category. The average practicality score from the student response questionnaire was 93.14%, which is also included in the very practical category. Thus, based on students' responses to the media developed, this media can be categorized as very practical. The results of data processing can be seen in Table 9 and Fig.7.

TABLE IX
STUDENT PRACTICALITY RESULTS

Indicator	Percentage	Criteria
Ease of Use Aspect	94.06	Very Practical
Aspects of Effectiveness of Learning Time	92.97	Very Practical
Aspects of Media Use	92.40	Very Practical
Average Percentage (%)	93.14	Very Practical

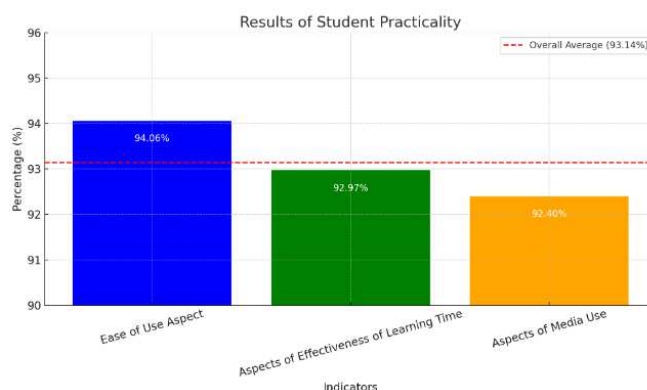


Fig. 7 Student Practicality Results

The results of this research are consistent with the findings of Hapsari [30], which shows that the media developed is effective with a gain score of 0.56, which is included in the medium category. Apart from that, the research revealed that there was a significant influence on the learning outcomes of students who used this media compared to those who did not use it, with a pretest-posttest significance value of $0.000 < 0.05$. This indicates that the media developed has a significant impact in improving student learning outcomes, so it is very effective for use in learning. Other research also shows similar results, where in hypothesis testing using the independent sample t-test, the two-tailed significance value was $0.000 < 0.05$. Thus, based on the results of the independent one sample t-test, it can be concluded that H_0 is rejected and H_1 is accepted. In conclusion, the use of digital video comic media is effective in increasing students' interest in learning and their learning outcomes.

IV. CONCLUSION

This study aims to develop animated comic video-based learning media using the Canva application, designed to improve the quality of learning in Informatics, particularly in the Computer System topic for eighth-grade students. The learning media was developed through the Four-D model (Define, Design, Develop, Disseminate), resulting in an innovative, systematic product that aligns with the needs of technology-based learning.

The validity of this learning media has proven to be high, with an overall average validity score of 0.963. Expert evaluations highlight that the visual design, material quality, and integration of media elements effectively support the delivery of lessons. The material validity, with an average score of 0.975, confirms that the media systematically and engagingly presents content aligned with curriculum objectives. This demonstrates that the Canva-based media meets educational feasibility standards.

The practicality of the media is also confirmed by feedback from teachers and students. Teachers rated the practicality at an average of 97.04%, while students rated it at 93.14%. The

media was praised for its ease of use, flexible access, and compatibility with various devices such as smartphones, laptops, and computers. Moreover, it provides an engaging and interactive learning experience, enabling students to learn independently or collaboratively.

This research underscores the importance of innovation in developing technology-based learning media to enhance educational quality. While primarily designed for Informatics, the media also has potential for application in other subjects with appropriate content adjustments. The integration of visual, audio, and interactive elements offers a more engaging learning experience, especially in the digital era.

However, the study acknowledges some limitations that open opportunities for further development. One such opportunity is integrating artificial intelligence (AI) to create more personalized and adaptive learning experiences. Additionally, testing the media with students of diverse characteristics and in other subjects can provide broader insights into its effectiveness. In the long term, this research is expected to serve as a reference for developing innovative, effective, and accessible learning media. By continually advancing such media, significant contributions can be made toward improving inclusive, technology-driven education quality.

AUTHOR CONTRIBUTOR

The main author, Asrul Huda, the author, was a supervisor in research activities ranging from article writing, reviewing, to editing. Meanwhile, the third and fourth authors played a role in reviewing the initial manuscript and providing input. Liza Mustika Sari, contributed to product development, research design, research implementation, data collection, and writing research articles.

ACKNOWLEDGMENT

We thank everyone who helped create this work, especially the Faculty of Engineering Universitas Negeri Padang, LPPM UNP, PTM, and the entire team. This research was funded by Universitas Negeri Padang through the Master's Thesis research program with contract number: 1769/UN35.15/LT/2024.

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