Development of Digital Comic Strip Media in Indonesian Language Learning to Enhance Critical Thinking Skills

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Abstract: This research is motivated by initial findings from interviews with teachers and students. The aims of this study are as follows: 1) to explore the design of developing digital-based comic strip media, 2) to assess the feasibility of digital-based comic strip media and 3) to evaluate the effectiveness of digital-based comic strip media. The method used is Research and Development (RnD). There are five stages of development in the RnD method based on the ADDIE model: analysis, design, development, implementation and evaluation. The results of the validation tests showed that the digital-based comic strip media received an 80% rating in the media expert validation test, categorizing it as feasible. In the language expert validation test, it received a 94% rating, categorizing it as very feasible and in the material expert validation test, it also received a 94% rating, categorizing it as very feasible. Furthermore, the digital-based comic strip media in indonesian language learning has proven effective in improving students' critical thinking skills, as demonstrated by the N-Gain test, which yielded an average score of 0.87 and an average percentage of 87.48. Therefore, digital-based comic strip media is deemed feasible for implementation and effective in enhancing students' critical thinking skills.

Keywords: Comic Strips, Digital Based, Indonesian Language Learning, Critical Thinking Skills

PRELIMINARY

Education is a conscious and planned effort to create an environment and learning process in which students actively develop their potential to possess religious values, self-control, personality, intelligence, noble character, and the skills necessary for themselves and society (Rahman et al., 2022). Therefore, education plays a crucial role in helping individuals develop their knowledge, behavior and skills. Currently, various issues related to education pose significant challenges in achieving high-quality education. These problems are the main causes of the decline in the quality of education in Indonesia today. This situation certainly requires special attention from the indonesian nation, as the quality of education heavily depends on the quality of the individuals produced.

In the educational process, teachers act as implementers and planners. However, it is known that students easily become bored with learning because teachers often choose unengaging learning media (Laily et al., 2022). As a result, many students struggle to understand and retain the subjects that have been taught. The current problem stems from teachers in schools, meaning that a teacher often asks students to memorize the material without understanding or applying it in their daily learning activities (Herawati, 2020). Therefore, students also need learning media as a means to help reinforce the information they receive during lessons at school. To enhance critical thinking skills, teachers also need to improve the learning processes conducted in the classroom. One way to achieve this is by using engaging learning media.

According to the data from the Programme for International Student Assessment (PISA) in 2022, as reported by the Organisation for Economic Co-operation and Development (OECD), Indonesia ranks 69th out of 80 countries assessed. With a total score of 1,108, Indonesia occupies the 69th position, making it one of the bottom 12 countries in the world. Indonesia remains in the lower-middle ranking compared to other ASEAN countries, where it ranks sixth with a total score of 1,100. This result indicates that the quality of education in Indonesia still requires improvement in several areas. In order for Indonesia to be prepared for PISA 2025 and to achieve higher international standards, significant reforms in the education sector must be implemented promptly.

Critical thinking skills are essential for the cognitive development of students. This ability can help them adapt to the rapid changes of the modern era, where they must possess strong critical thinking skills to manage the vast amount of information and new innovations. However, many students still struggle to handle these challenges and often choose to give up in the face of the situations and circumstances they are experiencing.

Critical thinking is the process of interpretation aimed at enhancing understanding and skillful, active evaluation of observations, communication, information and arguments (Yuliantaningrum et al., 2020). The ability to think critically should also be grounded in each student's thought process to analyze and generate insights regarding various issues, as critical thinking is a systematic process that enables students to formulate and evaluate their own beliefs and opinions. The critical thinking skills that students possess are highly beneficial for real life, where they face challenges both in their daily lives and in the workplace. Therefore, students need to develop an open,

reflective and critical mindset, engage in active learning, problem-solving, communication, teamwork and interpersonal skills more effectively.

Media refers to the tools used as a means of communication between the information provider and the information recipient (Nurfadhillah, 2021). Learning media specifically are tools that facilitate teachers in delivering lessons, while also helping students to understand the material being taught. Therefore, learning media can also serve as a means of interaction between teachers and students regarding the subject matter to be presented during the lessons.

However, there is a problem identified, namely the limited learning resources used in the educational process (Safitri, 2023). As a result, students become bored and lose focus while learning, which makes the learning process ineffective and difficult to achieve (Susanti et al., 2024). Therefore, learning media also play a crucial role in education, one of which is the implementation of digital comic strips as a learning medium in indonesian language instruction to enhance critical thinking skills.

In addition, the media used is not just comic books, but digital comic strips. Comic strips are stories conveyed through images, presenting only the essence of the narrative. Students are then asked to explain their understanding of the story they have read in the comic strips.

It is referred to as digital comic strips because we are now in the 21st century, where technology is increasingly integrated into various aspects, including education. The aim is for teachers to keep up with the advancements of the times. In this context, the indonesian language is used as a means to convey, receive and seek information or opinions derived from students' perspectives on the digital comic strips they have read and understood.

In relation to the theory identified, which involves the development of digital comic strips based on problem-based learning to enhance critical thinking skills in science, there is a similarity with the research that the author will conduct. In this study, the researcher uses digital comic strips as a medium for learning. Unlike previous research, which focused on science subjects, this study focuses on indonesian language instruction. It is hoped that the use of comic strips will help students improve their critical thinking skills in indonesian language learning.

Based on the background provided, this research aims to develop digital comic strips as a medium for indonesian language instruction to enhance critical thinking skills. It is hoped that this media can serve as an alternative in the learning activities, particularly to assist students in processing their thoughts regarding the issues they are facing.

METHOD

The research employs the Research and Development (RnD) method, which is a research approach used to produce a product and test its effectiveness (Sugiyono, 2013). The researcher utilizes the ADDIE model of RnD, which includes analysis, design, development, implementation and evaluation (Rivandani Ihsanah et al., 2023). The population and sample for this study consist of fifth-grade students (class V/A) at MIN Kota Cirebon, applying digital comic strips in indonesian language instruction. The indicators of improvement include 1) interpretation of problems, 2) analysis, 3) evaluation and 4) inference. The data collection techniques used are interviews, observations and tests. The data analysis techniques employed are normality tests, paired sample t-tests and N-Gain tests.

RESULTS

The following are the results obtained from the evaluation of the implementation of digital comic strips as a medium:

1. **Normality Test**

The criteria used for the normality test results are as follows: if the significance value (sig.) is less than 0.05, then the data is not normally distributed; whereas if the significance value is greater than 0.05, then the data is normally distributed. Below is an explanation of the results of the normality test:

Table 1 Normality Test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre_test	,087	21	,200[*]	,974	21	,817
Post_test	,203	21	,024	,951	21	,359

Based on the results of the normality test above, the pre-test obtained a significance value of 0.817, which is greater than 0.05, indicating that the data is normally distributed. Meanwhile, the post-test received a significance value of 0.859,

which is also greater than 0.05, confirming that the data is normally distributed as well. Subsequently, parametric statistical calculations will be conducted.

2. Paired Sample t-Test

This test is used by the researcher because the previous normality test indicated that both the pre-test and post-test results were normally distributed. Therefore, for the subsequent statistical calculations, the researcher will employ a parametric test in the form of a paired sample t-test. Below is an explanation of the paired sample t-test:

Table 2 Paired Sample Statistics
Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_test	51,4286	21	13,52247	2,95084
	Post_test	69,5238	21	16,34815	3,56746

The results of the t-test above indicate that the average pre-test score is 51, while the average post-test score is 70. Thus, the average score after the implementation of digital comic strips as a medium is higher than before. This data shows that there is an improvement in critical thinking skills after the application of digital comic strips.

To determine whether the observed improvement is effective, an N-Gain test needs to be conducted. Below is an explanation of the results from the N-Gain test:

Table 4 Descriptive Statistics of the N-Gain Test
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ngain_skor	21	,64	1,00	,8749	,12046
ngain_persen	21	63,64	100,00	87,4862	12,04645
Valid N (listwise)	21				

From the table above, it can be concluded that the average N-Gain score for critical thinking skills is 0.87. The improvement in students' critical thinking skills is 0.87, which is greater than 0.70. Therefore, this improvement falls into the category of high score assessment. When viewed from the percentage category of N-Gain, the result is 87.48, which is greater than 76. This percentage result falls into the category of effective improvement. Thus, the use of digital comic strips in indonesian language learning is considered effective in enhancing critical thinking skills.

DISCUSSION

1. Design in the Development of Digital Comic Strips as a Medium in Indonesian Language Learning to Enhance Critical Thinking Skills

The ADDIE model includes five stages: analysis, design, development, implementation, and evaluation (Rivandani Ihsanah et al., 2023). The following is an explanation:

a. Analysis

Analysis is the investigation of an event to understand the actual situation (Priyo Utomo & Indarto, 2021). The researcher conducts a situational analysis to gather data and information about the issues that arise during the learning process. Afterward, the researcher will seek solutions to address the previously identified problems.

Needs analysis is used to identify and understand the specific requirements related to a product and the urgency of the product to be developed. The analysis is conducted through qualitative data, specifically through interviews and observations. The researcher interviewed teachers and students from class V/A at MIN Kota Cirebon and also observed the learning process in the classroom. The results of the interview with the homeroom teacher of class V/A indicate that:

"belum pernah menggunakan media komik strips strips berbasis digital di pembelajaran, tetapi sudah pernah menggunakan perangkat digital. Karena adanya hambatan berupa sarana yang terbatas dan listrik yang tiba-tiba sering padam."

"Kalau pada proses penilaian kognitif, saya belum menggunakan pembelajaran berbasis digital untuk menguji kemampuan berpikir kritis siswa."

In addition, several students also mentioned in their interviews that:

"saya belum pernah menggunakan media pembelajaran dengan komik strips berbasis digital, tetapi sering membaca komik cetak di pojok baca. Selain itu, saya juga pengen menggunakan media pembelajaran terus menerus pada pelajaran bahasa indonesia, tetapi tidak menggunakan media pembelajaran yang sama secara terus menerus."
"Kita pernah diberikan link untuk belajar melalui google form yakni dengan mengerjakan soal."

b. Design

The next stage is the design phase. Design is a creative activity aimed at planning and creating something more functional and innovative to solve problems and provide

greater benefits for its users (Simbolon et al., 2022). Based on the results of the needs analysis conducted in the previous stage, the design phase focuses on designing or developing a product.

At this stage, one solution to make learning more engaging for students is for the researcher to develop a learning medium in the form of digital comic strips in indonesian language education to enhance critical thinking skills. The researcher designs the digital comic strips through the following steps: establishing initial competencies and learning objectives related to the main ideas, main sentences, and explanatory sentences in the indonesian language curriculum for fifth grade; creating a storyline for the digital comic strips based on the material found in the fifth-grade indonesian language workbooks; designing characters using Leonard AI; and once suitable characters are identified, the comic strip media is designed using the Canva application. Subsequently, the design is completed in the development phase and validated by designated validation experts.

c. Development

After completing the design phase, the next stage is the development phase. Development is a process of transforming existing potential or capabilities into something better or more useful (Ritonga et al., 2022). The researcher further develops the digital comic strips using the Canva application to create the digital comics and utilizes the Leonardo AI website to design the characters that will appear in the comic. In this phase, the researcher develops the comic strips by following the steps involved in creating comic strips, which include: determining the storyline of the comic strips, deciding on the format of the comic strips, creating the characters for the comic strips, arranging the images and narrative of the comic strips, and establishing the plot of the comic strips.

After that, validation tests were conducted by experts in the field. These experts evaluated the media, language, and content of the digital comic strips. Through the validation tests, it can be determined whether the digital comic strips are suitable for implementation with students. The development of this learning media aims to create a learning resource that not only assists in the learning process but also records and analyzes how students interact with one another, as well as how students engage with

the learning media. This data can be used to understand how the learning media impacts overall learning.

d. Implementation

Next, in the implementation phase, implementation refers to the activities, actions, and processes of a planned activity aimed at achieving a specific goal (Yuniar & Umami, 2023). At this stage, the product can be tested with students. The product is a digital comic strip media. The development of the digital comic strip media for indonesian language education to enhance critical thinking skills is implemented in class V/A at MIN Kota Cirebon, with a total of 21 students. This trial includes pre-test and post-test stages, which are the phases of indonesian language learning before and after the intervention.

The pre-test phase was conducted on tuesday, March 25, 2025. The researcher carried out the learning session before the intervention. The researcher used reading texts from the indonesian language workbooks, and the students were asked to complete the questions. The assessment results will later serve as a comparison with the results obtained after the intervention.

Next, the post-test phase was conducted on thursday, April 10, 2025. In this phase, the researcher conducted the learning session using the digital comic strip media. This stage also represents the learning phase after the intervention. Therefore, a comparison will be made to determine whether the use of digital comic strips can enhance the cognitive assessment of the students. Once the assessment results from both phases are obtained, a comparison will be made to identify any changes and improvements between the pre-test and post-test.

e. Evaluation

Evaluation is the activity of assessing a particular matter. To determine the value of something being evaluated, measurement is required. The form of this measurement is testing, which in the field of education is commonly referred to as a test (Phafiandita et al., 2022). Next, the results of the pre-test and post-test are calculated using statistical methods. This is done to observe the changes and improvements resulting from the implementation of the digital comic strip media.

2. **The Feasibility of Digital Comic Strip Media in Indonesian Language Education to Enhance Critical Thinking Skills**

The purpose of conducting the validation test is to evaluate the extent to which the designed learning media is appropriate and suitable for the established learning objectives (Fika & Sukmawarti, 2022). Below are the feasibility results obtained from the validation tests conducted by media experts, language experts, and content experts:

a) Based on the validation results from media experts, the validation questionnaire yielded a total score of 32 and an average score of 3.2, indicating a feasibility percentage of 80%. From this percentage, the validation achievement was categorized as valid. This means that the design and content of the digital comic strip media are suitable for implementation with students.

b) Based on the validation results from language experts, the validation questionnaire yielded a total score of 30 and an average score of 3.75, indicating a feasibility percentage of 94%. From this percentage, the validation achievement was categorized as very valid. This means that the language used in the digital comic strip media is highly suitable for implementation with students.

c) Based on the validation results from content experts, the validation questionnaire yielded a total score of 49 and an average score of 3.77, indicating a feasibility percentage of 94%. From this percentage, the validation achievement was categorized as very valid. This means that the content can be implemented in Indonesian language learning, tailored to the digital comic strip media, to help enhance students' critical thinking skills.

3. **The Effectiveness of Digital Comic Strip Media in Indonesian Language Education to Enhance Critical Thinking Skills**

The average N-Gain score for critical thinking skills is 0.87. The improvement observed in students' critical thinking skills is 0.87, which is greater than 0.70. Therefore, this improvement falls into the category of high score assessment. When viewed from the N-Gain percentage category, the result is 87.48, which is greater than 76. This percentage result falls into the category of effective improvement. Thus, digital comic strip media in indonesian language education is considered effective in enhancing critical thinking skills.

CONCLUSION

Based on the data analysis and discussion presented in the previous chapter, the following conclusions can be drawn:

1. The development of digital comic strip media in indonesian language education to enhance critical thinking skills utilizes the ADDIE model, which includes analysis, design, development, implementation, and evaluation. (1) in the analysis stage, the researcher conducted interviews and observations with teachers and several fifth-grade students (class V/A) at MIN Kota Cirebon. (2) in the design stage, the researcher created the initial design of the digital comic strip media. (3) in the development stage, the digital comic strip media was completed and refined through validation tests by validation experts. (4) in the implementation stage, the media that had passed the validation tests was then implemented in the classroom. (5) in the evaluation stage, the researcher calculated the results of the pre-test and post-test using statistical methods. This was done to observe the changes and improvements resulting from the implementation of the digital comic strip media.

2. The feasibility of digital comic strip media in indonesian language education to enhance critical thinking skills falls into the categories of suitable and highly suitable. Based on the validation from media experts, the validation questionnaire yielded a percentage of 80%, categorized as "suitable." Furthermore, based on the validation from language experts, the validation questionnaire resulted in a percentage of 94%, categorized as "highly suitable." Additionally, based on the validation from content experts, the validation questionnaire also yielded a percentage of 94%, categorized as "highly suitable."

3. The implementation of digital comic strip media in indonesian language education to enhance critical thinking skills has proven to be effective, with an average N-Gain score of 0.87, which is greater than 0.70. Therefore, the improvement observed falls into the category of high score assessment. When viewed from the N-Gain percentage category, the result is 87.48, which is greater than 76. This percentage result falls into the category of effective improvement. Thus, digital comic strip media in indonesian language education is considered effective in enhancing critical thinking skills.

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