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Development of Learning Media Development of Digital Comic Learning Media for Class IV Students in Pati District

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Abstract: Based on observations conducted by researchers with fourth-grade teachers within the scope of Dabin III Pati Regency, the use of media in science learning is still considered suboptimal, as seen from the low percentage of science learning outcomes. Therefore, it is necessary to develop learning media. This study aims to analyze needs, describe the development design, prove the feasibility, and demonstrate the effectiveness of digital science comic media for fourth-grade elementary school students in Pati District, Pati Regency. This research is a Research and Development (R&D) study using the Borg and Gall model development method. The aim is to develop digital science comic learning media by considering three quality aspects: validity, practicality, and effectiveness. Qualitative data collection techniques include documentation, interviews, and observation, while quantitative data collection techniques include tests and questionnaires. Data analysis includes initial data before the study, product development process data, product feasibility data, and data on the effectiveness of the digital comic learning media. The study population was all fourth-grade students of SDN Pati Kidul 01 in January 2024. The stages in media development consist of: 1) Exploring local wisdom in science material; 2) Determining characters and characteristics; 3) Arrange the comic dialogue/storyline according to the material; 4) Enter the Canva application/web; 5) Design the digital comic with the help of the Canva application according to the storyline that has been created; 6) The digital comic that has been in Canva format is downloaded in PDF format. After the Canva-based digital comic is completed, the next stage is validation which consists of validation from language, material, and media experts to provide assessments and input in the form of criticism and suggestions for the media. Furthermore, the overall average score of validation from language, material, and media experts was 3.31, 3.48, and 3.39, all three of which are included in the "Very Feasible" criteria. Feasibility is also supported by the results of the student and teacher response questionnaire which showed an average score of 3.31 and 3.25 with the "Very Good" and "Good" criteria.

Keywords: Learning Media, Digital Comics, IPAS

1. Introduction

Education in the 21st century, also known as the Industrial Revolution 4.0, coexists with the use of digital technology and 21st-century learning skills. 21st-century learning is a learning transition where the developed curriculum guides schools to shift their learning approach from teacher-centered to student-centered. This aligns with future demands, which require students to possess thinking and learning skills. Furthermore, 21st-century learning possesses characteristics that can support current educational goals, namely creativity and innovation, critical thinking and problem-solving, communication, and collaboration. The achievement of 21st-century skills is supported by educators' ability to develop lesson plans that incorporate the 4C activities (Septikasari & Frasandy, 2018).

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One important aspect that deserves to be promoted, yet a major challenge for education practitioners, is how to implement one of the 21st-century skills, critical thinking. Critical thinking skills are closely related to science and social studies learning, which were later combined into IPAS (Natural and Social Sciences) in the independent curriculum. Critical thinking skills have received significant attention in the development of student thinking. This is because in the era of globalization, all information is readily accessible to students. This easy access to information requires students to be able to sort through each piece of information they receive. Aeni (2014) states that critical thinking is rational and reflective thinking focused on deciding what to believe or do.

Critical thinking skills can be combined with science and social studies learning, so it is hoped that students will be able to solve various problems encountered in their daily environment. Therefore, to foster critical thinking skills in students in science learning, teachers need to be sensitive and responsive to their needs. Teachers are expected to play a role in fostering an engaging, inspiring, and creative learning environment. Teachers are also required to possess strong competencies in the student learning process (Yulyani et al., 2020).

ased on the results of the questionnaire, interviews, and observations above, it can be concluded that digital learning media that can improve students' critical thinking skills is essential, particularly in the science and science curriculum in elementary schools.

The development of this digital educational comic is also supported by research conducted by several other researchers. Feni Andayani et al. (2020) found that developing digital comics is necessary to improve students' critical thinking skills. Consistent with this research, Marlina Idayanti (2021) in her study stated that digital comics are needed by students and teachers to improve the understanding of natural resource concepts and the environmental character of fourth-grade elementary school students.

1.1 Conceptual framework

Several challenges are encountered in science learning at several elementary schools in Dabin III, Pati District. Pre-research conducted through questionnaires distributed using Google Forms and interviews with teachers in Dabin III, Pati District, revealed that few teachers use interactive learning media, particularly digital learning media, in science learning. This is due to the limited availability of digital-based science learning media. Another problem is students' lack of critical thinking skills during science learning, as the learning process is still dominated by lectures rather than the use of media, especially digital media. Consequently, student learning outcomes in science learning, particularly in the topic of Social and Cultural Diversity in Indonesia, tend to be low.

The solution to this problem is to develop a Canva-based digital educational comic that can help students understand the material on Social and Cultural Diversity in Indonesia and improve critical thinking skills, especially for fourth-grade elementary school students. The

development of the Canva-based digital comic was validated by validators who are experts in language, materials, and media to ensure product quality. This validation process will result in product revisions to achieve optimal results. Following this, a field trial will be conducted with a predetermined sample. Finally, the Canva-based digital comic learning media will be ready for implementation in science lessons, making the learning process more engaging, meaningful, and enhancing students' critical thinking skills.

1.2 Research objectives

This research was conducted to determine the need for digital comic learning media for science. The collected data will be used as a basis for proposing intervention materials to improve students' conceptual understanding and critical thinking skills.

2 Methodology

2.1 Research design

The development of this Canva-based digital comic learning media used the Research and Development (R&D) method. Sugiyono (2016:297) explains that the research and development method is a method used to produce a specific product and test its effectiveness. In this study, the researcher chose the Borg and Gall model because it is sufficiently detailed at each stage and can be adapted to conditions in the field.

2.2 Respondents of the study

The data sources for obtaining field problems, needs data, product feasibility data, and product effectiveness data in this study were teachers and fourth-grade elementary school students in the Pati District III Development Area (Dabin) in Pati Regency. Feasibility data was obtained from validators who were experts in language, materials, and media. The data sources collected in this study were:

1) Data on the process of developing Canva-based digital comic learning media for fourth-grade elementary school students using predetermined research procedures;

2) Data on the effectiveness of Canva-based digital comic learning media in the fourth-grade elementary school science curriculum on the topic of Social and Cultural Diversity in Indonesia.

The instruments used in this study consist of qualitative and quantitative research instruments. The qualitative research instruments include interview guidelines and a critical thinking skills observation sheet. The quantitative research instruments include a conceptual understanding test on Social and Cultural Diversity in Indonesia, an expert validation sheet, and a questionnaire for field trials.

Table 1. Average Test of Conceptual Understanding and Critical Thinking Skills of Control Class

No.	**Aspek Pengumpulan Data**	**Mean**	
Before Learning	**Sesudah Pembelajaran**		
1	The Concept of Cultural Diversity & Local Wisdom	58,33	63,33
2	Critical thinking skills	58,85	63,54

3. Findings and discussion

The following are the results of data collection in determining the understanding of concepts and critical thinking skills of grade 4 students through the use of the Digital Comics learning media for science.

The table above shows a modest increase in the average score. Therefore, it can be concluded that learning using the accompanying textbook and student worksheets (LKPD) does not significantly improve the understanding of the concept of Cultural Diversity & Local Wisdom and the critical thinking skills of fourth-grade elementary school students. However, to determine the effectiveness of Canva-based digital comic learning media, prerequisite tests such as normality and homogeneity tests must be passed.

The results of the independent sample t-test conducted to measure critical thinking skills are as follows.

Table 2: Results of the Independent Sample T-Test for Critical Thinking in Experimental Class A and the Control Class

		Levene's Test for equal of Vaariances		T-test for Equality of Means						
		F	Sig	t	df	Sig(2-tailed)	Mean Difference	Std Error Difference	95% confidence Interval of the Difference	
									Lower	Upper
Nilai	Equal varieces assumed	,678	,419	-3,207	22	.004	-12,50000	3,89756	-20,58304	-,15093
	Equal Variances not assummed			-3,207	21,478	.004	-12,50000	3,89756	-20,59444	-,15093

Table 3: Results of the Independent Sample T-Test for Critical Thinking in Experimental Class B and the Control Class

		Levene's Test for equal of Vaariances		T-test for Equality of Means						
		F	Sig	t	df	Sig(2-tailed)	Mean Difference	Std Error Difference	95% confidence Interval of the Difference	
									Lower	Upper
Nilai	Equal varieces assumed	,44	,835	-2,748	22	.011	-11.97917	4,30351	-20,90409	-3,05424
	Equal Variances not assummed			-2,748	21,941	.011	-11.97917	4,30351	-20,90549	-3,05285

The independent t-test significance values obtained for students' critical thinking skills were 0.004 and 0.011. Both values are lower than the 0.05 significance level, supporting the acceptance of the alternative hypothesis (Ha) and the rejection of the null hypothesis (H0). Therefore, this study concludes that there is a significant difference in critical thinking skills between students who participated in learning with Canva-based digital comics and those who did not.

Based on the above data, it can be concluded that the research hypothesis is that Canva-based digital comics are effective in helping students understand the concept of Cultural Diversity & Local Wisdom and in improving the critical thinking skills of fourth-grade elementary school students in Pati District.

Based on the needs analysis, Canva-based digital comics were identified as a necessary medium to help fourth-grade students in Pati District understand the concept of Cultural Diversity & Local Wisdom and improve critical thinking skills. Furthermore, the analysis also underscored the importance of utilizing gadgets in learning to support students' understanding of the material. This is reinforced by Railan and Fatimah's (2018) research in their international journal entitled "Teaching Writing Narrative Text by Using Webtoon Digital Comic to Senior High School Student," which states that information and communication technology, such as digital comics, plays a significant role in facilitating the achievement of learning objectives and increasing student enthusiasm. In the development stage, researchers began with a simple design that had been created. However, before creating the Canva-based digital comic design, a storyline was first created so that the digital comic flow was clear and directed and the material presented was in line with learning outcomes and learning objectives. Quantitative data in the form of questionnaire assessment scores and qualitative data in the form of comments and suggestions were obtained from the expert validation process. The questionnaire assessment scores from each validator showed the category "very feasible," and this qualitative feedback was then used as a reference in revising the Canva-based digital comic learning media. Thus, it can be proven that the use of Canva-based digital comic learning media effectively helps fourth-grade elementary school students in Pati District, Pati Regency, in understanding concepts and developing their critical thinking skills.

4. Conclusions and recommendations

1.) The need for Canva-based digital comics for fourth-grade elementary school students in Pati District is high, as revealed through interviews, questionnaires, and researcher observations. 2.) The design of the Canva-based digital comics was carried out through a series of structured stages. After the design stage was completed, the next step was validation by experts in the fields of language, materials, and media to obtain assessments and feedback in the form of criticism and suggestions. 3.) The validator's assessment results showed an overall average score of 3.31 in the main (expanded) trial, qualifying as "very good." The results of the teacher response questionnaire analysis showed an overall average score of 3.25 in the main (expanded) trial, qualifying as "good." 4.) The results of data processing were carried out through SPSS (Ver. 16) in the paired t-test based on the pretest and posttest data on the understanding of the concept of Cultural Diversity & Local Wisdom in the experimental class, showing a significance of <0.05, namely 0.000 for experimental class A and 0.005 for experimental class B. While the significance of students' critical thinking skills in experimental class A and experimental class B was 0.000. Next, the results of the independent t-test statistical data processing of the understanding of the concept of Cultural Diversity & Local Wisdom with the SPSS program showed a significance of <0.05, namely 0.049 for experimental class A with the control class and 0.048 for experimental class B with the control class. Then, students' critical thinking skills showed a significance of <0.05, namely 0.004 for experimental class A with the control class and 0.011 for experimental class B with the control class. This proves that the use of Canva-based digital comics is effective in helping students understand the concept of Cultural Diversity & Local Wisdom and the critical thinking skills of fourth-grade elementary school students in Pati District, Pati Regency.

Based on the above conclusions, the author would like to provide suggestions to readers in general and colleagues in particular. Teachers are permitted to use the Canva-based digital comics developed in this study as a learning medium to improve the understanding of concepts about Cultural Diversity & Local Wisdom and critical thinking skills of fourth-grade elementary school students. Teachers need to analyze and determine effective learning media to improve understanding of learning concepts that are in accordance with learning outcomes and objectives. Canva-based digital comics as learning media should pay attention to appropriateness standards in terms of material, language, and media. The results of this research and development can be used as a reference for conducting further research and product development that is beneficial to the world of education.

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Conflict of Interest

The authors declare no conflicts of interest

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