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Development of Komipa Media to Improve Students Scientific Thinking at MIS Al-Musthafawiyah

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ABSTRACT

The research entitled "Development of Komipa Media to Improve Students' Scientific Thinking at MIS AL-Musthafawiyah" was carried out by students who have scientific thinking in the field of Natural Sciences (Natural Sciences). This research shows that teachers use discovery in teaching materials. The aim of this research is to measure the development of students' scientific thinking by using comics as a learning medium. Previously, teachers used traditional media and rarely used comics. This research is an RND (Research and Development) study following the ADDIE model. The number of class III students at MIS Al-Mustafawiyah who took part was 18 people. Collection methods include questionnaires, interviews, and tests before (pretest) and after (posttest). The comic material assessment results show very high accuracy of up to 95%. In terms of language, the figure is 91.66%, which is also considered very important, and for media products it reaches 93.3% and in terms of design it gets a score of 80%. Teachers' responses to the use of comics as a teaching medium show that comics are a very valid learning medium with a rating of 89.9%. Meanwhile, students' opinions on comics show that learning comics is very practical with a score of 89.2%. which will occur pre and post tests provide the most effective N growth of 86.7%. Based on research results, it is proven that komipa media is very easy and effective in improving students' science/scientific thinking skills at MIS Al-Mustafawiyah and is used by teachers as a solution, especially when the material changes the form of objects.

Key Word *Development, Computer Science, Scientific Thinking, Students.*
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INTRODUCTION

Scientific thinking is very necessary for students, scientific thinking provides students with a strong foundation in understanding the surrounding environment and being able to solve problems well. (Kuhn, 2010) Scientific thinking is an effort to seek knowledge. This term includes all types of thinking that aim to increase the knowledge of the person who carries it out. So scientific thinking is an activity carried out by every

human being. With supporting conditions, the scientific thinking process can produce scientific understanding, the desire to achieve scientific understanding will encourage the scientific thinking process.

Scientific thinking involves an experimental phase for students to foster students' understanding of their environment, while the scientific thinking process involves a process of observation, questioning and understanding the surrounding environment which gives students curiosity to seek their own knowledge (Anas, 2016: 234) is that scientific thinking plays a very important role for students because scientific thinking is a process of seeking knowledge based on facts, structured and systematic and looking for answers using facts and stages to reach a specified conclusion or goal (Bahak Udin, 2018:3).

This will stimulate students' scientific thinking to seek their own knowledge and reach conclusions based on existing evidence. This scientific thinking ability will be very necessary for students in the future (Tahnia et al., 2022:67). The importance of scientific thinking will develop a deeper understanding of observed phenomena where there will be an observation process, hypothesis testing can develop valid conclusions about observed phenomena. Scientific thinking means one of the factors that influences student learning outcomes and decisions. (Afifah, Hamidatul, 2023:190) Students are expected to get used to thinking scientifically, sharpening scientific thinking really influences students to get used to facing challenges and opportunities in the future. (Tahnia et al., 2022:67).

However, in reality the level of scientific thinking of students is still quite low based on data (The Program For International Assessment) during the last period (2018 to 2022) measured by PISA students in Indonesia in the field of science there is no significant change from the previous year, Scientific Thinking It could be said that students did not experience improvement, especially in science, mathematics, reading and science subjects, all of which received below average scores. These facts are based on data published by the OECD (The Organization for Economic Cooperation and Development), an institution that builds prosperity, equality, opportunity and happiness for all people and utilizes 60 years of experience and knowledge to prepare for a better world future. (PISA 2022 results:1)

From interview data from the class III teacher at MIS Al-Musthafawiyah with Mr. Edy Trisno, the class III teacher, the results of the interview stated that students in class III had not yet seen their ability to think scientifically. This condition can be seen in the students' daily test scores and categorized as grades. which is quite low, the kkm value is <75, the low scientific thinking ability is based on students because students may not react rationally to the knowledge they receive. Another problem related to the lack of scientific thinking is based on the reasons that the media used is limited, using LKS books so that learning is quite monotonous and makes students learn teacher-centered,

where students only listen to the teacher's explanation and students do not participate enough in the learning process. Scientific thinking is defined as thinking that uses sound logic and reason to think, explain, analyze and make decisions about knowledge. Scientific thinking can be defined in sharing knowledge, through the means of language, logic, facts, mathematics, science and statistics. (Sumarni, 2023:107). Science learning is learning that allows students to think scientifically, where students are trained to learn knowledge based on the surrounding environment, so students must be able to think scientifically and learning media are needed that can support accessible learning, to overcome the problem of students' weak scientific thinking in the world of education, So it is necessary to provide learning that can support students' scientific thinking. In this way, the author was inspired to create a product in the form of comics as a learning medium. The author hopes that the creation of comics will be a solution to the above problems. Several studies related to the use of comic media have been carried out, including.

RESEARCH METHOD

At the design stage, the product is designed based on needs identified at the school through needs analysis during interviews. The steps taken are::

Curriculum analysis

At this point, the researcher analyzed the curriculum used at the school. The curriculum used in this school is the 2013 curriculum and is based on Ministry of Education and Culture regulation number 37 of 2018 concerning amendments to Minister of Education and Culture Regulation number 24 of 2016 concerning core competencies and basic competencies of the 2013 curriculum. Below is an introduction to the basic competencies used :

Comic Creation

In making this comic, the work was done using the Canva application. This process involves adjusting images and characters to suit children's preferences and supports learning in science subjects with a focus on changing the shape of objects.

Development (Devolopment)

The aim of this stage is to disseminate Comic products to improve students' scientific thinking whose suitability will be influenced by their validity. This validity stage is divided into 3 media validation aspects, material validation aspects, language validation aspects and design experts. This validation activity is intended to measure the practicality and validity of the media as a good medium to use in the learning process.

The next stage to determine the effectiveness of Komipa in improving scientific thinking was carried out in the form of tests, namely pretest and posttest. The

development of Komipa is aligned with the design stages that have been carried out previously. At this stage, the comic was developed using the Canva application.

Media Validation

This comic media is validated from a media perspective, where the appropriateness aspect of the media is in the form of comics to improve students' scientific thinking which will later be tested based on the validation aspect. This comic media is validated by a media expert, namely Mrs. Andin Halimsyah Rambe, M.Pd. The media expert's assessment is the appropriateness of the size of the comic, the appearance of the layout on the cover, appropriate colors, letters, comic illustrations, choice of paper type, color composition with writing, appropriate image shape.

RESULT AND DISCUSSION

Implementation

At this stage, implementation was carried out by giving the comic to students in class III at MIS AL-Musthafawiyah. Implementation is carried out for students by teaching using comics and material in the comics, then after being taught, participants do questions by guessing the objects around them.

Practicality of Comic Media

Teachers' answers are used to monitor comic assessments. The teacher's response was given to the class teacher at MIS Al-Musthafawiyah, namely Mr. Edy Trisno, S.Pd.

Table 1.
The results of the Teacher's Responses

NO	Indikator	score	Maximum score	Presentase
1.	Aspects of Attraction	21	24	87,5%
2.	Material Aspects	22	24	91,6%
3.	Language Aspects	11	12	91,6%
Category		90,2%		
		Very Practical		

In Table 1 the average figure recorded is 90.2%. This shows that the use of computer science to improve students' scientific thinking is very practical. Based on media validation, the interesting aspect is very easy with a score of 87.5%, the material media is very easy with a score of 91.6%, and the linguistic aspect is very practical with a score of 91.6%. Also very practical criteria. So it can be concluded that komipa media which aims to increase students' knowledge can be said to be a very simple tool.

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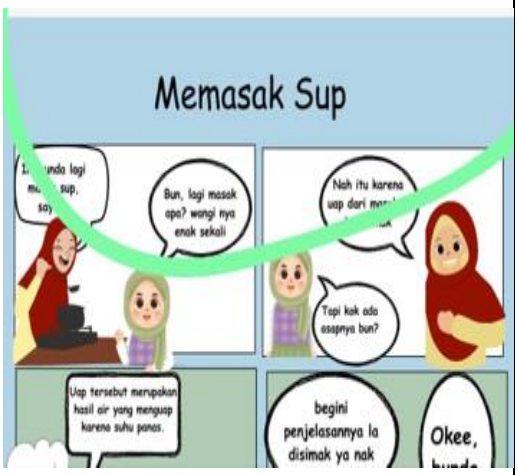
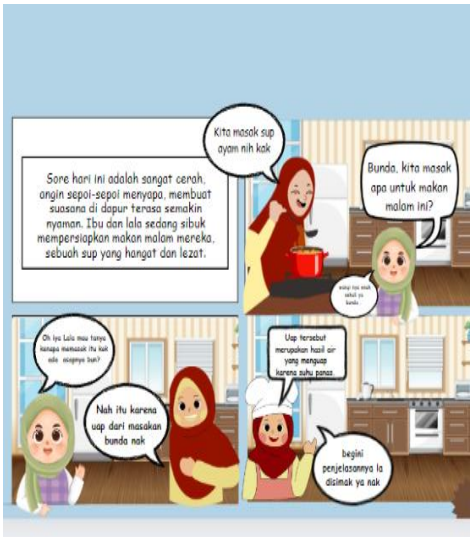
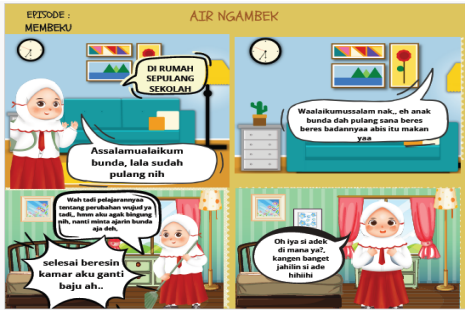
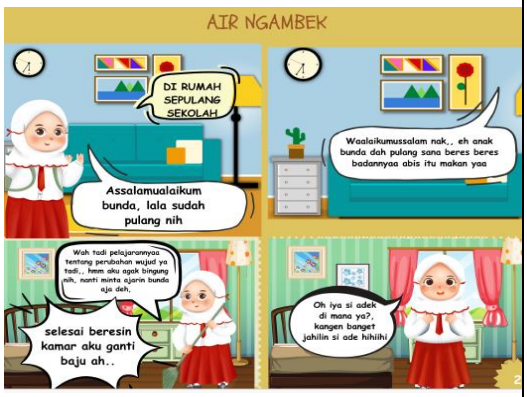
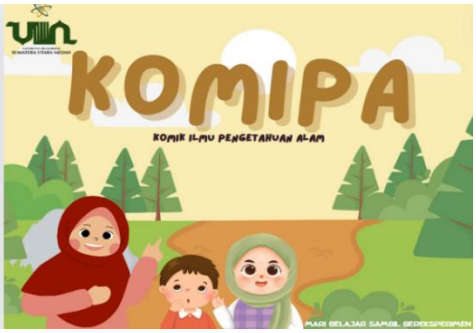
This assessment/evaluation activity is carried out by measuring the relevance of the comics being tested among students. This feasibility is seen based on the effectiveness aspect obtained from increasing students' scientific thinking

Comic before revision	Comic after revision
 **Note: Create the author's name**	
 Repair : No need to use episodes	
Before 	After

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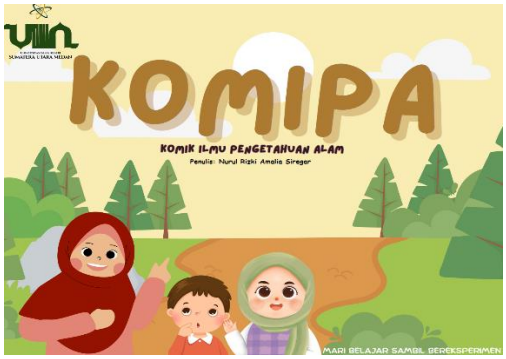
Note: Create the author's name	

Comic Effectiveness

Pretest and Posttest

The stage for testing the effectiveness of this comic is through post-post-test procurement activities. Pre-test activities were carried out before testing comic products on students and posttests were carried out when the comic products were given. The results obtained will be the N-Gain Pretest and Posttest N-Gain Tester Class III MIS Al-Muthafawiyah results.

Tabel 2.

Pretest and Posttest Results

No	Name	Value		Posttest-pretest	Skor Ideal (100)-Pretest	N-Gain Score	N-Gain Score (100%)
		PRETEST	POSTTEST				
1.	AA	30	90	60	70	0,85	85%
2.	AL	50	90	40	50	0,8	62,5%
3.	ALS	40	90	50	60	0,833	83,3%
4.	AZZ	40	80	40	60	0,666	66,6%
5.	AS	40	100	60	60	1,00	100%
6.	AF	50	100	50	50	1,00	100%
7.	AT	50	100	50	50	1,00	100%
8.	DA	50	100	50	50	1,00	100%
9.	DB	30	100	70	70	1,00	100%
10.	CN	50	80	30	50	0,6	60%
11.	RF	40	100	60	60	1,00	100%
12.	RS	30	80	50	70	0,71	71%
13.	RY	30	90	60	70	0,85	85%
14.	SZ	50	80	30	50	0,6	60%
15.	NZ	50	80	30	50	0,6	60%
16.	MA	50	80	30	50	0,6	60%
17.	MF	50	80	30	50	0,6	60%
18.	HR	40	80	40	60	0,666	66,6%
Amount		**810**	**1670**	**14,375**			
Average value		**45**	**92,7**	**14,918**			
Presentation		**86,7%**					

$$\text{N-gain} = \frac{posttest\ score - pretest\ score}{Maximum\ score} \times 100$$

$$= \frac{92,7-45}{100-45} \times 100$$

$$= \frac{47,7}{55} = \frac{0,867}{100} = 86,7\%$$

Based on the pretest and posttest results in table 4.1.5.1, it shows the feasibility of komipa media. The questions listed can stimulate students to improve scientific thinking with a percentage score of 86.7%. It can be concluded that the use of compa to improve students' scientific thinking is very effective in improving scientific thinking. Demonstrates a high level of effectiveness in understanding the media, and student responses, all achieving a high percentage with very practical criteria. Therefore, it can be considered that the use of computer science to improve scientific thinking is very suitable for helping students in the process of improving students' scientific thinking.

CONCLUSION

With product development research, comic-based products were created to increase students' scientific thinking skills. Practicality and efficiency tests have confirmed this feasible suitability.

1. With validation, comics with material changing the shape of objects have a validity of 95% with a very valid category. The suitability of comics in terms of media experts is 93.33%, categorized as very valid. Linguist experts obtained a percentage of 91.66% for design experts reaching 80% with a very valid category. Thus, the total validity of this comic reaches a percentage of 89.9% and is categorized as very valid media
2. The practicality of using komipa was evaluated according to the class teacher's answer, with (90.2%) assessing the practical use of komipa in developing students' scientific thinking as very simple. Meanwhile, in "practical" complaints, students' responses were simple/practical (89.2%).
3. The effectiveness analyzed according to the pre-test and post-test results was obtained with N-Gain (86.7%) in the "very effective" category. The high ratio of the three factors of feasibility, practicality and efficiency means that komipa is suitable for use as a teaching tool in learning activities that develop students' scientific thinking.

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