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THE USE OF AUDIO VISUAL MEDIA IN MATHEMATICS SUBJECTS TO IMPROVE CRITICAL THINKING OF STUDENTS

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ABSTRAK

Students in learning mathematics often only focus on memorizing formulas. This causes students' critical thinking skills to not develop optimally. The ability to think critically is very important for the lives of students because with it students will be able to solve the problems they face by taking or making effective decisions. The purposes of this study are (1) to describe the implementation of audio-visual media in mathematics to improve critical thinking in class 4 MI Podorejo Tulungagung? (2) Describe the inhibiting and supporting factors in the use of audio-visual media to improve critical thinking for class 4 MI Podorejo Tulungagung? (3) Describe the impact of using audio-visual media on increasing critical thinking in class 4 MI Podorejo Tulungagung. This study uses a qualitative approach. The research location is in MI Podorejo Tulungagung. This study uses a qualitative approach. Data collection techniques used are observation, interviews, and documentation. The data validation technique uses source triangulation and technical triangulation methods. The data analysis technique used is Miles and Huberman's data analysis with data condensation steps, data presentation, and drawing conclusions. The results of this study indicate that the implementation of audio-visual media using learning animation videos starts from the teacher preparing the equipment, conditioning the class, and students analyzing the video content, besides that the teacher also uses various methods such as question and answer, demonstrations, lectures. Factors that support the use of audio-visual media are adequate facilities and infrastructure, enthusiastic students, and high teacher professionalism. Meanwhile, the inhibiting factor for using audio-visual media in increasing critical thinking is that students lack self-confidence even though they have the right answers. The impact of using audio-visual media is that students have motivation and to learn so that critical thinking skills and student learning outcomes increase.

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1. INTRODUCTION

21st century education is defined as an education system that prioritizes the development of the industrial revolution 4.0 which can influence the world of education with the use of technology. (Aswita and et al 2018) In this century, all components in schools, starting from the principal, educators, and education staff, as well as students, are required to develop his skills in a manner sustainable. One of the skills that students must have is critical thinking. Critical thinking or critical thinking is an attempt to collect, interpret, analyze, and evaluate to draw convincing and valid conclusions. (Fristiadi and Haninda Bharata 2015) This ability is very important for

the lives of students because with it students will be able to solve the problems they face by taking or making effective decisions. (Mika Sari Dewi 2022) Therefore, students must master critical thinking skills so that they are more skilled at constructing arguments, checking the credibility of sources, or making decisions. (Sulistiani and Masrukan 2016)

Critical thinking skills are predicted to have a close relationship with mathematics, because critical thinking skills provide more appropriate directions for students in thinking, working, and help more accurately determine the relationship to something else. (Asep Sukenda Ego 2016) However, most students have the same opinion about mathematics, which is boring and difficult. Learners naturally will experience process learning Which more meaning If they pushed For think critical And participate active with experience process That Alone. (Nur and Kursini 2022) The learning process that makes students think critically is caused by the teaching materials used, as explained by Muhibin, namely teaching materials influence critical thinking so that they can solve problems. (Muhibbin and et al 2019) Therefore it is necessary to vary the learning strategies that must be mastered by the teacher, so that the learning process does not become monotonous. Teachers should also try to encourage students to think critically . The solution offered by the teacher is is use media audio visual in learning, Which expected can increase five sense learners, specifically vision And hearing. (Mika Sari Dewi 2022) Environment Study Which innovative based technology information And communication (audio visual) very help Teacher in process learning Because can give flavor like, interest And material Which easy understood by students . (Herlina and et al 2020)

Research conducted by Pratiwi concludes that there are significant differences from the use of audio-visual media and image media on learning outcomes. Media use audio visual in learning can be said to be effective and from learning outcomes using audio-visual media there is an increase in learning outcomes before using audio-visual media. Based on the research above, it can be seen that audio-visual media has an effect on critical thinking. However, from a number of studies, no one has explored data about the use of audio-visual media in mathematics in a qualitative manner, so this provides an opportunity for researchers to do so. Therefore, researchers are interested in conducting the latest research with the title "Using Audio Visual Media in Mathematics Subjects to Improve Critical Thinking of Grade 4 Students at MI Podorejo Sumbergempol Tulungagung." The purpose of this study is to describe the implementation, inhibiting and supporting factors, and the impact of audio-visual media to improve students' critical thinking.

2. METHOD

The type of research used in this research is qualitative. Qualitative research is research on research that is descriptive and tend to use analysis . *(Ismail Suardi Wekke 2019)* Lexy J Moleong stated that qualitative research is research that intends to understand the phenomenon of what is experienced by research subjects for example behavior, perception, motivation, action, etc., holistically, and in a way descriptive in the form of words and language, in a special context that is natural and using natural methods . *(Abdul Gafur 2022)* According to Arikunto, descriptive research is research that is intended to investigate the circumstances, conditions or other things that have been mentioned, the results of which are presented in the form of a research report . (Suharsini Arikunto 2013) The main characteristic of this research method is that the researcher is directly involved in the field, acts as an observer, creates categories of actors, observes phenomena, records them in observation books, does not manipulate variables, focuses on natural observations. (Ismail Suardi Wekke 2019) The purpose of using a descriptive approach is because the researcher wants to describe the problems that arise and describe the data in form words according to the facts during the research in order to understand the phenomenon regarding the inhibiting and supporting factors and the impact of using audio-visual media in increasing students' critical thinking.

The instrument in qualitative research is the researcher himself (human instrument). (Surapta and Mahmiyah 2021) This is reinforced by the opinion of Miles, the presence of researchers in the field in qualitative research is absolute, because researchers act as research instruments as well as data collectors. (Albi Anggito and Setiawan 2018) The role of the researcher in this research is as a complete observer. The role of full observer means the researcher is near the scene, looking, observing, taking notes, however not involved in the incident being observed (Hasyim Hasanah 2016) . Data collection was carried out by means of observation regarding the learning process directly when using audio-visual media and during conventional learning, observations were made by looking at the forms of audio-visual media used by teachers in the teaching and

learning process, then to deepen the data in the field also used interview techniques and the necessary documentation as research supporting data. This research was carried out through several activities, namely observation to see the use of media, interviews with respondents and research documentation. Data wettability technique uses technique and source triangulation. Researchers use data analysis using the Miles and Huberman Model. Miles and Huberman assume that analysis consists of three streams of activities that occur simultaneously, namely: data reduction, data presentation, and drawing conclusions.

3. RESULTS AND DISCUSSION

A. Implementation of audio-visual media in mathematics subjects in improving Grade 4 Critical Thinking at MI Podorejo Tulungagung

The implementation of grade 4 audio-visual media at MI Podorejo Tulungagung has been going well, supported by the ability of teachers who are proficient in using it. The following are the steps used by Amalia as a mathematics teacher in using audio visual as a medium for learning mathematics in grade 4:

1. Prepare audio visual media equipment

   Before learning begins the teacher prepares audio-visual media tools such as laptops, sound, projectors, and cables. Then the teacher installs the equipment according to the procedure. In learning mathematics, the teacher chooses to use learning videos that support material in learning mathematics and these videos are taken from YouTube and are selected in an interesting way, the language is easy to understand, the visuals are attractive, the video uses storytelling techniques instead of lectures, there is a question and answer interaction from the video for participants. students, the video quality is clear, the language in the video is easily understood by elementary school students, not too much music.

2. The teacher conveys material with a variety of methods

Figure 1. The use of audio-visual media in learning

At this stage, the teacher explains the material by pausing the video and then asking students' difficulties. If there is something that is not understood by students, the teacher explains it by writing it on the blackboard. Then if the students understand, the video is played again. The delivery of this material uses lecture, question and answer, and demonstration methods. It is at the question and answer and demonstration stages that students' critical thinking skills are tested. Students express their opinions or provide reasons for the answers they have chosen and the teacher provides feedback.

3. Question giving

Figure 2. Students doing assignments

After all the material has been communicated correctly, the teacher will give homework to students. Homework is intended for students to know what material they have mastered or not. Homework is a learning method in which the teacher gives homework to students individually with the aim of stimulating students to be active in learning.

4. Review answers

After the students' answers have been collected, the next step is to review the answers together. In addition to increasing understanding, this step aims to enable students to improve their critical thinking skills because apart from expressing their own opinions students also help other students by answering unanswered questions.

The implementation of the use of audio-visual media to improve students' critical thinking skills that have been carried out by mathematics teachers as above contains indicators of critical thinking. There are various theories that suggest indicators of thinking skills, one of which, according to Norris and Emnis, divides indicators of thinking skills into five main activities that can actually form activity units, namely:

a. Provide simple explanations, focusing on questions and asking and answering questions about an explanation.
b. Build the basic skills of observing and considering the results
c. Conclusion
d. Provide further explanation
e. Setting strategies and tactics, determining actions and interacting with others.

Table 1 Critical Thinking Indicators

Critical Thinking Indicator	**Critical Thinking Sub-Indicator**	**Explanation**
Elementary clarification **(providing a simple explanation)**	1. Focusing questions	a. Identify and formulate questions b. Identify criteria for considering possible answers c. Maintain a state of mind
	2. Analyze arguments	a. Identify conclusions b. Identify stated (explicit) reasons (cause) c. Identify reasons (causes) that are not stated (implicit) d. Identify irrelevance and relevance. e. Look for similarities and differences f. Look for the structure of an argument

		g. Summarize
	3. Ask and answer clarifying questions and challenging questions	a. Why is that? What's the point, what does it mean? b. What is an example, what is not an example? c. How to implement it in such cases? d. What difference causes it? e. Would you say more than that?
Basic support **(building basic skills)**	4. Consider the credibility (criteria) of a source	a. Expert b. There is no internal conflict c. Inter-source agreement d. Reputation e. Using existing procedures f. Know the risks g. Ability to give reasons h. Cautious habits
	5. Observe and consider the results of observations	a. Get involved in concluding b. Reported by the observer himself c. Write down the things you want d. Reinforcement and possible reinforcement e. Good access conditions f. Competent use of technology. g. Observer satisfaction on the credibility of the criteria
Inference **(make inferences)**	6. Make deductions and consider the results of the deduction	a. Logical group b. logical condition c. Interpretation of statements
	7. Make an induction and consider the results of the induction	a. Make generalizations b. Make conclusions and hypotheses
	8. Make and consider decisions	a. Fact background b. Consequence c. Application of principles d. Balancing, deciding
Advance clarification **(providing further explanation)**	9. Define terms and consider definitions	a. Forms: synonyms, classifications, ranges, equal expressions, operational, examples and non-examples b. Definition strategy (action, identify similarities) c. Content (content)
	10. Identify assumptions	a. Implicit reasoning b. Necessary assumptions, reconstructions, arguments

***Strategy and tactics* (set strategy and tactics)**	11. Decide on an action	a. Define a problem b. Selecting a criterion to create a solution c. Formulate possible alternatives d. Deciding things to do tentatively e. Do a review f. Monitor implementation

Research findings regarding the use of audio-visual media in mathematics learning to improve students' critical thinking at MI Podorejo Tulungagung strengthen the findings from research conducted by Susilowati which states that the use of audio-visual media can improve students' critical thinking skills. The results of this study also corroborate the results of research conducted by Made Prima Restapi and Muhamad Samsudin which stated that the application of audio-visual with a scientific approach increased learning motivation and students' critical thinking skills. Utami also showed in her research that the use of audio-visual media can improve students' critical thinking skills.

B. Factors Supporting and Inhibiting the Use of Audio Visual Media in Improving Students' Critical Thinking in Mathematics Class 4 MI Podorejo Tulungagung

Factors supporting the use of audio-visual media are determined from the conditions of the school, teachers and students. If the school does not have audio-visual media equipment, then the use of audio-visual media cannot work. However, MI Podorejo Tulungagung has facilities and infrastructure that support audio-visual media. Then the professionalism of the teacher becomes a supporting factor. Grade 4 teachers have high integrity, good time discipline, always try to provide an understanding of students carefully and patiently. The last thing besides the condition of schools and teachers is the condition of students. Students have enthusiasm in learning mathematics using audio- visual media so that it can support the success of learning.

Inhibiting factors in the use of audio-visual media distracted students' concentration. Like talking with friends or thinking about other things. So that this becomes an obstacle in learning mathematics, there is no projector screen facility. As Ismiati's opinion said, the nature of audio-visual media communication is only one-way, so it needs to be balanced through reciprocity with other parties so that students don't get bored easily.

In dealing with these inhibiting factors the teacher provides a solution, that is, after using learning media, the teacher re-explains the material received as described. In addition, the teacher also checks students' understanding by asking questions by giving questions. Later, the teacher will know how far the students' understanding of the learning has been.

C. The Impact of Using Audio Visual Media in Mathematics Learning to Improve Critical Thinking in Class 4 MI Podorejo Sumbergempol Tulungagung

The impact of using audio-visual media in increasing critical thinking in mathematics learning can be found after the researchers conducted observations and interviews with teachers and students. Learning by using audio-visual learning media has negative and positive impacts.

The positive impact of using audio-visual media:

a. Audio visual media can attract the attention of students

The use of audio-visual media can attract students' attention in the learning process. The use of visual media can also be directly relevant to students. This of course will motivate students in the learning process so that it is easier to achieve their learning goals. Encouraging the desire to know more, this is due to its fun audiovisual nature with pictures that are made as attractive as possible so that children are still interested and want to know more. Azhar Arsyad's theory also shows that teaching media can increase and focus children's attention so that it leads to learning motivation, more direct interactions between students and their environment, and makes students learn on their own according to their abilities and interests.

b. Increase student learning motivation

Students become more motivated and interested as the learning process progresses, students are not easily bored with the media used by the teacher, because in this case the teacher uses the media in various ways so that students feel more comfortable and interested. understand the material better. easier. According to Sardiman, learning motivation is a psychological factor that is non-intellectual and has a very

special role, namely increasing a sense of interest and interest in learning. Motivation to learn is one of the factors that support the success of learning.

c. Increase student activity

The use of audio-visual media at MI Podorejo Tulungagung together with audio-visual media can make learning mathematics more enjoyable and increase student motivation, this is shown by the enthusiasm of students in the learning process in class. to be able to carry out student activities in the classroom.

d. The ability to think and the power of imagination of students to be better

Learning that is obtained visually (visual) or by hearing (audio) can accelerate the process of students' understanding of the lessons conveyed. In addition to the positive impact, the use of audiovisual media in learning mathematics also has a negative impact.

The negative impacts of using the media are:

a. Students are not focused when there is no assistance from the teacher

The unidirectional nature of audio-visual media causes no feedback or it is different from what the teacher conveys. Students cannot directly ask questions in the video.

b. Takes longer

In addition to the preparation for using audio-visual media that must be mature, there are other things that cause the learning time to increase. One of them is not all students can quickly think critically. Still trusting his friend's answer rather than his own answer. Still do not understand what has been explained.

To achieve learning objectives, educators must use learning materials that can involve students positively. One of the best models for achieving mathematics learning objectives that require active and critical thinking from students is through the use of audiovisual media. Raharjo's research results show that teaching and learning activities will be more effective and easier if they are supported by audio-visual media.

4.CONCLUSION

Based on the results of research conducted at MI Podorejo Tulungagung regarding the use of audiovisual media in learning mathematics, it can be concluded that the application of the use of audiovisual media in learning mathematics can improve critical thinking skills. Student assessment requires careful preparation, starting from the beginning. preparing material, selecting videos that are relevant to the topic and learning objectives, as well as preparing questions to measure students' understanding of documents.

The use of audio-visual media in learning mathematics in grade 4 has supporting factors and inhibiting factors. Supporting factors include adequate facilities and infrastructure, enthusiasm of students, and teacher professionalism. While the inhibiting factor is the condition of the students who are not always focused and the use of audio-visual media takes longer. Therefore, the teacher prepares before the implementation day so that learning time can be efficient.

The impact of using audio-visual media on learning mathematics has two impacts, namely positive and negative impacts. On this positive impact, among others, audio-visual media can attract the attention of students, increase student learning motivation, increase student activity, thinking ability and imagination of students to be better. Meanwhile, the negative impact of using audio-visual media is that students are not focused when there is no assistance from the teacher and it takes a long time.

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