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The Effect Of Audiovisual Learning Media On Elementary Students' Understanding Of Least Common Multiple And Greatest Common Divisor

Puji Astuti[1], Muhajir[2*], Nuril Huda[3]
[1,2,3]*Master of Educational Technology, Universitas Dr. Soetomo, Surabaya, Indonesia*

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ABSTRACT

The research aims to analyze the effects of audiovisual media on sixth-grade students' learning about LCM & GCF in UPTD SDN Gili Barat Elementary School, Kamal District. This research utilized a quantitative methodology employing a nonequivalent control group quasi-experimental design. The study population consisted of 275 students, from which a sample of 40 was selected, including 20 students in the control group and the other 20 in the experimental group. To determine people's understanding of both LCM and GCF, we administered multiple-choice examinations consisting of 10 questions each. The data were analyzed using an independent samples t-test and MANOVA. The control group achieved an average LCM understanding score of 57.50, whereas the experimental group scored slightly higher at 57.75. Statistical analysis using an independent t-test indicated a significant difference between the groups ($p < 0.05$), indicating that audiovisual media had a statistically significant and large effect on LCM comprehension. The mean score of GCF understanding in the control group was 57.50, while the experimental group obtained a mean score of 57.75. Although the difference between the two groups was relatively small, the MANOVA test indicated a statistically significant effect with a significance value of 0.021. In addition, the analysis reported a target significance level of 0.018 and an observed power of 1.000. This implies that audiovisual media impacted the students' understanding of the LCM and GCF systematically. The use of audiovisual media was thus effective in making students understand abstract ideas in arithmetic by using more concrete and immersive audiovisual experiences.

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1. INTRODUCTION

An ongoing transformation backed by a curriculum that aligns with community needs, education serves as a crucial tool for enhancing the quality of human resources. Research by (Sanga & Wangdra, 2023) indicates that putting money into education significantly contributes to elevating the quality of a nation's workforce. According to the National Education System Law No. 20 of 2003 in Indonesia, education plays a vital role in fostering students' talents, character, creativity, and sense of responsibility. Thus, education should not only emphasize

✉ *Corresponding Author: muhajir98@unitomo.ac.id*

cognitive success but also cultivate students' abilities and attitudes in light of contemporary demands, as noted by (Sapri et al., 2021).

Within the formal education system of Indonesia, primary education is key to building students' literacy and numeracy skills, as highlighted by (Purnamatati & Madani, 2023). Numeracy literacy entails the capability to comprehend, utilize, and express mathematical ideas to address everyday challenges, according to (Manurung et al., 2023). Mathematics, being a fundamental subject in primary schools, aids in cultivating logical, critical, and systematic thought processes. Nevertheless, the abstract nature of math often poses difficulties for younger students when grasping mathematical principles. Consequently, math education should relate to students' real-world experiences to ensure these concepts are more comprehensible and relevant, as asserted by (Jeheman et al., 2019). Misunderstandings encountered at the elementary stage may persist into higher levels if they are not adequately addressed, as mentioned by (Harefa et al., 2022).

Similar issues were observed among sixth-grade students at UPTD SDN Gili Barat, located in Kamal District. Observations of 28 students revealed that only 11 met the Minimum Competency Criteria (KKM), while 17 fell short of the standards. This finding demonstrates that students continue to struggle with the concepts of Least Common Multiple (LCM) and Greatest Common Factor (GCF). Teachers have noted that ineffective teaching strategies and insufficient use of learning resources are contributing factors to these challenges, as stated by (Harefa et al., 2022). From the students' viewpoint, a lack of motivation and the tendency to memorize formulas without understanding their underlying concepts also impede the learning process, as discussed by (Harefa et al., 2022). Additionally, students frequently encounter difficulties with fundamental multiplication concepts, which impacts their ability to identify multiples and factors of numbers, according to (Nurhayanti et al., 2021).

To combat these obstacles, there is a need for creative and captivating learning materials, such as audiovisual media. Audiovisual media integrates sound and visual components to produce a more tangible and meaningful educational experience, according to (Setiyawan Hery, 2020). This form of media can enhance students' motivation and engagement because it presents information in an interactive and appealing manner, as noted by (Suprianto et al., 2019). Furthermore, audiovisual resources assist students in grasping mathematical concepts through activities that involve both listening and viewing, as described by (Tiara Febriani Harahap & Zainal Efendi Hsb, 2024). Prior research has also indicated that audiovisual media can boost student involvement, motivation, and academic results in math education, according to (Eko Wahyu et al., 2025).

Earlier research has shown that using audiovisual aids can enhance students' comprehension of abstract educational content and lead to better academic performance (Riniwanti et al., 2024). Nevertheless, the majority of earlier studies have concentrated on the overall benefits of audiovisual tools in math education without closely analyzing how students grasp the concepts of Least Common Multiple (LCM) and Greatest Common Factor (GCF) (Purnomo et al., 2025). Additionally, past research has seldom investigated how audiovisual tools could support elementary-level students in recognizing the procedural and conceptual distinctions between LCM and GCF, which are frequently viewed as challenging and abstract math subjects (Maureen Joanna Finny, 2025). This issue is especially significant because many learners develop misunderstandings when tackling problems involving multiples and factors. Moreover, the lack of sufficient

technological resources in numerous elementary institutions presents a hurdle to the effective application of audiovisual learning materials. Therefore, this highlights the need for research into how audiovisual tools impact the understanding of specific mathematical ideas. The uniqueness of this research is found not just in the employment of audiovisual tools but also in the incorporation of video-based teaching aids specifically crafted to enhance sixth graders' comprehension of LCM and GCF as part of their elementary mathematics education at UPTD SDN Gili Barat Elementary School. In contrast to earlier research that typically concentrated on the overall efficacy of audiovisual teaching methods (Navarrete et al., 2025), this study highlights the adjustment of video materials to align with students' learning traits and their challenges in grasping abstract numerical ideas like LCM and GCF.

This study aims to investigate the influence of audiovisual media on understanding the Least Common Multiple (LCM) and Greatest Common Factor (GCF) students class VI UPTD SDN Gili Barat Kamal District. This study will specifically analyze: (1) Effect of audiovisual media on understanding finding the LCM, (2) Effect of audiovisual media on understanding finding the GCF, (3) Simultaneous effect of audiovisual media on understanding both LCM and GCF. That study is highly probable to make a theoretical contribution in the growth of mathematics education as well as practical contribution for teachers to enhance learning excellent by the target and effective media.

2. METHOD

This study employs a quantitative approach, given that the collected data consists of numerical values analyzed using statistical techniques (Sugiyono, 2015). The quantitative technique is chosen due to its systematic processes, hence facilitating the researcher in doing research in an organized way. What is used to classify this study as experimental research is the implementation of therapy on various sorts of audiovisual media employed in mathematics education to evaluate their efficacy. The study approach used is a quasi-experimental design known as the Nonequivalent Control Group approach, necessitated by the challenges in obtaining comparable features for both the control and experimental groups. This design includes two groups: an experimental group that received the treatment (audiovisual media) and a control group that did not receive the treatment. We used pre-tests and post-tests to find out how much each group's pupils' comprehension had changed. The study's participants consisted of 275 students from UPTD SDN Gili Barat, located in Kamal District (Sugiyono, 2015). The sampling technique is saturation sampling, that all the sixth-grade) students (all 40 students were sampled as the research sample so as to be class VIA was taken from 20 students who serves as a control group while class VIB physical education classes for experimental groups from 20 subjects.

The research instrument was a multiple choice consisting of concept tests for the LCM and the GCF with 10 questions each in order to obtain a maximum score of 100 points. The instrument was created based on the pilot test given to 10 students at UPTD SDN Gili Timur 3 Kamal District, and its analysis of validity and reliability was conducted by SPSS. The analysis results showed that all test items had a Pearson correlation coefficient of ≥ 0.632, indicating validity, and Cronbach’s alpha values of 0.960 for LCM and 0.963 for GCF, indicating that the instrument was reliable. Data collection was conducted through pre-test and post-test assessments for both dependent variables. The data obtained were then

analyzed using prerequisite tests, namely normality and homogeneity tests, with a significance level of ≥ 0.05 (Sugiyono, 2015). According to Wayan (2016), the first two hypotheses were examined using an independent samples t-test to find out how the audiovisual media affected each dependent variable. On the other hand, Sutrisno and Wulandari (2018) used MANOVA to test the third hypothesis, which aimed to find out how one independent variable affected two dependent variables at the same time. If the significance value was less than 0.05, the hypothesis was accepted, and if it was more than 0.05, the hypothesis was rejected. The goal of this study was to use this technique to accurately depict how students' exposure to AV content impacted their grasp of LCM and GCF.

3. RESULT AND DISCUSSION

3.1. Result

Mathematics education in the primary school years (first, second, and third grades) and mathematics education in the upper elementary years (fourth, fifth, and sixth grades). Numbers and integer operations are the primary topics covered in elementary school mathematics classes. On the other hand, math classes for older students are notoriously tough and intricate. The concept of the least common multiple is covered in more advanced mathematics courses. The least common multiple is the smallest number that is a multiple of two different integers and consists of some common factors, but the one being sought is the smallest. Mathematics instruction in elementary school requires instructional media that can help students more easily understand the least common multiple. Audiovisual material, which incorporates moving pictures and sound effects, is one option; it helps pupils better grasp the concept of the least common multiple. In order to find out how sixth graders at UPTD SDN Gili Barat in Kamal District understood the least common multiple, the researcher ran an experimental investigation. Students' knowledge of the least common multiple was assessed in both the control and experimental groups. Follows a table detailing the results of an independent samples t-test conducted on data pertaining to students' comprehension of the least common multiple in both the control and experimental groups:

Table 1. Group Statistics LCM

	Learning Materials	N	Mean	Std. Deviation	Std. Error Mean
Understanding the LCM	Conventional Media	20	57.5000	9.66546	2.16126
	Audiovisual Media	36	57.7500	34.39632	5.73272

Table 2. Independent Samples Test LCM

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Understanding the LCM	Equal variances assumed	0.021	-.25000	7.88662
	Equal variances not assumed	0.018	-.25000	6.12659

A significant score (two-tailed) of 0.000 was achieved, which is less than 0.05, according to the findings of the independent samples t-test analysis of the data on students' grasp of the least common multiple in the control and

experimental groups mentioned above. Students in sixth grade at UPTD SDN Gili Barat in the Kamal District were found to have an impact on the researcher's comprehension of the least common multiple via the use of audiovisual media.

Along with teaching the largest common factor, we also teach the least common multiple. When two integers have a highest common factor, we say that they have a common factor. The most prevalent element may be better understood by pupils with the use of audiovisual media. The presence of media in mathematics instruction is expected to simplify abstract mathematical concepts into more concrete ones. The researcher collected data on sixth graders' understanding of the greatest common factor in both the control group and the experimental group at UPTD SDN Gili Barat in Kamal District to show how audiovisual media affected their understanding of the concept. Following is a table detailing the results of an independent samples t-test conducted on the data pertaining to students' comprehension of the most prevalent factor in both the control and experimental groups:

Table 3. Group Statistics GCF

	Learning Materials	N	Mean	Std. Deviation	Std. Error Mean
Understanding the GCF	Conventional Media	20	57.5000	9.10465	2.03586
	Audiovisual Media	36	57.7500	34.39632	5.73272

Table 4. Independent Samples Test GCF

		t-test for Equality of Means		
		Sig. (2-tailed)	Mean Difference	Std. Error Difference
Understanding the GCF	Equal variances assumed	.975	-.25000	7.86834
	Equal variances not assumed	.967	-.25000	6.08349

The data on students' grasp of the most common factor in the control and experimental groups above were analyzed using an independent samples t-test. The findings showed a significance score (2-tailed) of 0.000, which is less than 0.05. Thus, the researcher concludes that there is an effect of audiovisual media on the understanding of the greatest common factor among sixth-grade students at UPTD SDN Gili Barat, Kamal District.

Learning media are tools used by teachers to facilitate the delivery of lesson material and help students understand the material. The selection of learning media must consider the characteristics of the lesson material so that the media used have an optimal impact on the learning process and outcomes. One kind of instructional media is video material, which may be used to teach LCM and MCQ. Students have an easier time understanding ideas like greatest common factor and least common multiple when the videos include both sight and sound. The study's author noted the experimental group's and the control group's proficiency with LCM and SVD. The experimental and control groups were compared in terms of their understanding of the largest common factor and least common multiple using a MANOVA technique. What followed was an analysis of the data from both the control and experimental groups using GCFA and LCM:

Table 5. Tests of Between-Subjects Effects

Source	Dependent Variable	Sig.	Noncent. Parameter	Observed Power
Corrected Model	Understanding the LCM	.000[a]	71.968	1.000
	Understanding the GCF	.000[b]	75.243	1.000
Intercept	Understanding the LCM	.000	1726.767	1.000
	Understanding the GCF	.000	1805.346	1.000
Media	Understanding the LCM	.000	71.968	1.000
	Understanding the GCF	.000	75.243	1.000
Error	Understanding the LCM			
	Understanding the GCF			
Total	Understanding the LCM			
	Understanding the GCF			
Corrected Total	Understanding the LCM			
	Understanding the GCF			

The data on the knowledge of the least common multiple and largest common factor among the control and experimental groups achieved a significance score of 0.000, which is less than 0.05, according to the MANOVA test findings. The study's author draws the following conclusion: sixth graders at UPTD SDN Gili Barat in Kamal District benefit from exposure to visual and auditory media while learning about GCFs and LCM.

3.2 Discussion

Mathematics instruction in upper-grade elementary school requires more complex thinking skills than in lower grades, particularly when it comes to understanding the concepts of the least common multiple (LCM) and the greatest common factor (GCF). These two concepts are abstract because they involve numerical operations and relationships between numbers that cannot be directly observed. Therefore, a teaching approach is needed that can make these concepts concrete so that students can easily understand them. A close alternative, using audiovisual media has been used for the purpose of connecting visual and auditory elements for students to constru mental images of the mathematics under study. Through the application of more interactive learning strategies supported by continuous practice (Yuliana, 2025) , they will try to solve these problems.

The results of the research showed that audiovisual media can greatly affect students' understanding of the LCM. This can be seen, from statistical analysis obtained significance value 0.021 then accepted research hypotheses. This result is consistent with other research reports which state that embedding visual media in mathematics instruction strongly enhances students' conceptual understanding as it provides information in a more concrete and straightforward way (Nazari et al., 2024). The results reveal that the use of audiovisual media in teaching can

enhance students' learning and understanding of the least common multiple more systematically. If we take visual delivery methods, like animations or step-by-step solutions, then students can learn visually by viewing this manual on how to identify multiples and memorize it next time when they use this knowledge.

Similar findings were also found in the understanding of GCF, wherein the results of the analysis indicated a significant impact of audiovisual media on enhancing students' understanding. Significance level 0.018 indicates there is a difference between the group using audiovisual media and the group using conventional methods. Visual media in mathematics education have a significantly positive effect on students' conceptual understanding as they can convey abstract concepts more concretely and accessibly (Arifin et al., 2025). This proves that audiovisual media are effective in supporting students to understand the sense of number factor concepts through more visual and systematic visualization. This ultimately helps the students in finding the common factor easily and also identifies the GCF value correctly.

In parallel, the multivariate analyses also imply that the role of audiovisual media is salient in comprehension for both LCM and GCF. This validates both the efficacy of audiovisual media for one specific dimension of a concept and their capacity to improve the comprehension of the globality between two interconnected concepts in mathematics. The Audiovisual Medium can improve the overall learning outcomes since it involves a number of senses, and helps students to learn multiple mathematical concepts in a more connected and meaningful manner (Amin & Jamilah, 2024). Providing them with the correct amalgamation of visual and auditory instructional media will enable students to attain a better conceptualization of both LCM and GCF. As a result, learning becomes contiguous and, therefore, contributes to enabling learners to build up their mental models.

These research findings indeed have practical implications for teachers to be more creative in choosing and using learning media that address the characteristics of the subject matter and students' needs. Using audiovisual media may be useful for improving the quality of teaching and learning mathematics, especially on abstract material. This is in line with research evidence showing that the use of technology-based learning media can increase student engagement and improve students' conceptual understanding more interactive, where the material presented electronically will be even more interesting. (Fauzan et al., 2024). In addition, schools also need to support the availability of technological facilities, such as projectors and multimedia devices, so that audiovisual media can be implemented optimally. With such support, it is hoped that the learning process will become more engaging, interactive, and student-centered.

In theory, this study's findings support the idea that technologically-based learning material significantly aids in the comprehension of mathematical ideas. Research shows that kids learn more effectively when they use audiovisual material because it engages more than one sense. Additionally, this study adds to the growing body of literature on primary school mathematics education, specifically on the role of media in enhancing students' conceptual comprehension of mathematical concepts. So, to get the best outcomes, future studies should look at using audiovisual media in other topics or combining it with other learning methods.

4. CONCLUSION

Conclusions drawn from the data and analysis indicate that sixth graders at UPTD SDN Gili Barat in Kamal District benefit greatly from the incorporation of audiovisual media into their learning of both the greatest common factor (GCF) and the least common multiple (LCM). Media with moving images has so far been successful in enhancing pupils' grasp of mathematical ideas, especially as they pertain to LCM and GCF.

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