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# Meta Analysis: The Effect of Learning Videos on Learning Outcomes

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**ABSTRACT**
Video learning is a medium that displays information in the form of moving audio and visuals. Learning videos have been widely used since the Covid-19 pandemic. Learning videos are considered effective and efficient as learning media, because the teacher does not need to explain the material repeatedly, while students can replay the video when they have learning difficulties. This study aims to determine the impact of learning videos on student learning outcomes, as measured by Effect Size (ES). The research method used is a literature study of 25 articles from Google Scholar, Mendeley and Science Direct. The novelty of this study is that the number of articles analyzed is greater than the meta-analysis with the same variables, and this article analyzes all levels of education. The average effect size of the influence of learning videos on learning outcomes is high, at the education level SD = 1.92 (High Category), Middle School = 2.96 (High Category), High School = 2.87 (High Category), College = 3.24 (High Category)..

***Keywords:*** *Size Effect, Learning Videos, Learning Outcomes, Literature Study.*

## 1. INTRODUCTION

Since the Covid-19 pandemic, learning videos have become one of the most effective media to use in delivering teaching materials. The information presented in the video can be repeated by students [1]. Learning videos can help students understand abstract material [2] , increase learning motivation [3], and improve students' skills [2]

Capacitor and Semiconductor Diode Learning Videos have been implemented in the Electrical and Electronics Learning Period July-December 2022 at the Department of Automotive Engineering FT UNP. In Electrical & Electronics Elearning, 2 types of video capacitors and semiconductor diodes are presented, namely to support student practicum activities and avoid theoretical misconceptions. The impact of practicum learning videos based on observations made is that learning time is more efficient because lecturers no longer need to demonstrate practical activities repeatedly, students can watch learning videos when experiencing problems in carrying out practicum procedures.

While the impact of learning videos on understanding the concept of semiconductor capacitors and diodes is not significant, this is based on the results of the Semester Final Examination (UAS), 68% of students are unable to answer questions correctly related to semiconductor capacitors and diodes. Research that has been published in various scientific journals, generally learning videos have a positive effect on learning outcomes both at the education level of Elementary School (SD), Junior High School (SMP), Senior High School both SMA/SMK/MAN and tertiary institutions.

Meta-analysis of the effect of learning videos on learning outcomes has already been carried out, it's just that the sample articles used are still around 5-10 samples. [4]revealed the effect of learning videos on Physics and Science learning outcomes, as many as 6 sample articles produced an effect size of 1.33. Effect size shows the level of association between learning video variables and learning outcomes. [5]conducted an analysis of the use of video in relation to learning outcomes and interest in Biology lessons. The sample used is 10 national articles, but does not explain the size effect between variables and only tabulates digital media in the form of videos from the 10 articles. The meta-analysis carried out [6], the influence of learning videos from the elementary, high school/vocational/man school levels, is 10 articles with an effect size of 1.43.

A meta-analysis related to the effect of learning videos on learning outcomes has been carried out, but because the sample is limited to 10 articles and not all levels of education are reviewed, and based on the results of observations made, this meta-analysis is repeated. Until the meta-analysis in this article there were 25 articles, which consisted of elementary to university education levels.

## 2. METHOD

The method used is a literature study. The procedure carried out in this meta-analysis consists of 3 stages, namely as follows: (1) Preparation Stage ; consists of (a) Collecting articles from Google Scholar, Mendeley and Science Direct with the keywords "learning videos, learning videos"; (b) Archiving articles for independent variables: learning videos and dependent variables: learning outcomes; (c) Sorting articles related to learning videos that have Pre Test (X0), Post Test (X1), Sample and Standard Deviation (SDX0) values from the experimental class; (d) Summarize research data in the form of types of learning videos used as well as research objectives, conclusions and recommendations; ( 2 ) Implementation Phase : consists of (a) Tabulating data such as table 2 in Excel, by first inputting the educational level studied, number of samples, Pre-Test, Post-Test values, Samples and Pre-Test Standard Deviations; (b) Each article is given a name coding based on the serial number of tabulated data to facilitate source input and so that the tabulated data is synchronized with the reference article; (c)Filtering and grouping data based on education level; (d) Provide a code for each group of educational levels. Higher education group (PT) with codes A-1 to A-5 , high school education level groups consisting of high schools, vocational schools and men with codes B-1 to B10. Junior high school level (SMP) with codes C1 to C3 and elementary education levels (SD) with codes D1 to D7; (3) The data analysis phase consists of: (a) Analyzing the Effect Size (ES) based on the average values of the Pre Test (X0), Post Test (X1), Sample and Standard Deviation (SDX0) of the experimental class; (b) Analyze the influence between variables ; (c) Calculating the Size Effect (ES) using the Becker & Park formula (Khoiri 2019) as follows:

$$ES = \frac{Mean\ \ Post\ Tes(X_0) - Mean\ Pre\ Test\ (X_1)}{Stndart\ Deviasi\ Pre\ Test\ (SD_{X0})} \ldots . (1)$$

(d) After knowing the effect size (ES) value of each article, it is then interpreted in Table 1.

**Table 1**. Effect Classification Size – Cohen's

(Khoiri 2019)

| Effect Size (ES) | Standard Category |
|---|---|
| 0 ≤ ES ≤ 0.2 | Low |
| 0.2 ≤ ES ≤ 0.8 | Currently |
| ES ≥ 0.8 | Tall |

## 3. RESULTS AND DISCUSSION

The effect size is a measure of the magnitude of the effect of the independent variable (learning videos) on the dependent variable (learning outcomes), and usually also aims to reveal the significance of the research results (Santoso 2010) . Effect size analysis, the 25 articles were grouped into 4 educational level groups, namely higher education with 5 articles, high school with 10 articles, junior high school with 3 articles and elementary school level with 7 articles. The articles that became the sample for the meta analysis were articles published from 2010 to 2022 , for more details can be seen in Table

**Table 2.** Recapitulation of the Effects of Learning Videos on Learning Outcomes

| No | Code Article | Source | Level | N | $X_0$ | $X_1$ | $SD_{X0}$ | Size effect | Ket |
|---|---|---|---|---|---|---|---|---|---|
| 1 | A-1 | (Hardini, 2014) [7] | PT | 35 | 5.83 | 6,91 | 3.88 | 0.28 | Middle |
| 2 | A-2 | (Anggela et al., 2021) [8] | PT | 15 | 59.47 | 67.07 | 11.04 | 0.69 | Middle |
| 3 | A-3 | (Anas, Aswar; Munir, 2019) [9] | PT | 33 | 61.42 | 80.18 | 9.17 | 2.05 | High |
| 4 | A-4 | (Alwehaibi, 2015) [10] | PT | 51 | 2.88 | 28.94 | 2.28 | 11.44 | High |
| 5 | A-5 | (Brata, 2010) [11] | PT | 30 | 53.33 | 71.83 | 10.53 | 1.76 | High |
| 6 | B-1 | (Hendarto et al., 2012) [12] | SMA/SMK/MAN | 39 | 58.15 | 69.08 | 7.49 | 1.46 | High |
| 7 | B-2 | (Anggono & Lubis, 2020) [13] | SMA/SMK/MAN | 144 | 67.14 | 84.14 | 10.59 | 1.61 | High |
| 8 | B-3 | (Tasmalina & Prabowo, 2018) [14] | SMA/SMK/MAN | 41 | 66.51 | 85.53 | 9.53 | 2.00 | High |
| 9 | B-4 | (Azhara1 & Saragih, 2022) [15] | SMA/SMK/MAN | 35 | 67.57 | 85.69 | 6.26 | 2.89 | High |
| 10 | B-5 | (Setyo Putro, 2018) [16] | SMA/SMK/MAN | 17 | 54.77 | 63.12 | 7.40 | 1.13 | High |
| 11 | B-6 | (Kadri & Rahmawati, 2015) [17] | SMA/SMK/MAN | 36 | 46.11 | 71.67 | 5.79 | 4.41 | High |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 12 | B-7 | (Werdhiana & Wahyono, 2021) [18] | SMA/SMK/MAN | 26 | 8.35 | 14.38 | 2.66 | 2.27 | High |
| 13 | B-8 | (Windasari & Sofyan, 2019) [19] | SMA/SMK/MAN | 30 | 57.60 | 84.96 | 12.54 | 2.18 | High |
| 14 | B-9 | (Imelda et al., 2019) [20] | SMA/SMK/MAN | 27 | 28.44 | 47.48 | 2.78 | 6.85 | High |
| 15 | B-10 | (Brame, 2016) [21] | SMA/SMK/MAN | 31 | 55.97 | 78.11 | 5.62 | 3.94 | High |
| 15 | B-10 | (Hybrid et al., 2022) [22] | SMA/SMK/MAN | 31 | 55.97 | 78.11 | 5.62 | 3.94 | High |
| 16 | C-1 | (Iwantara et al., 2014) [23] | JUNIOR HIGH SCHOOL | 34 | 19.91 | 44.12 | 3.08 | 7.86 | High |
| 17 | C-2 | (Harefa & Laia, 2021) [24] | JUNIOR HIGH SCHOOL | 23 | 58.00 | 65.00 | 5.92 | 0.44 | Middle |
| 18 | C-3 | (Ilyas et al., 2020) [25] | JUNIOR HIGH SCHOOL | 42 | 62.50 | 77.26 | 5.76 | 0.57 | Middle |
| 19 | D-1 | (Dewi & Pagarra, 2021) [26] | SD | 11 | 47.27 | 82.27 | 2.52 | 2.79 | High |
| 20 | D-2 | (Purba et al., 2019) [27] | SD | 41 | 53.91 | 73.00 | 5.47 | 1.23 | High |
| 21 | D-3 | (Dasar, n.d.)[28] | SD | 26 | 53.96 | 80.04 | 2.29 | 2.12 | High |
| 22 | D-4 | (Siswa et al., 2022) [29] | SD | 18 | 14.84 | 21.33 | 8.21 | 0.79 | Middle |
| 23 | D-5 | (Sari & Fatonah, 2022) [30] | SD | 41 | 7.80 | 11.80 | 2.14 | 1.87 | High |
| 24 | D-6 | (Dwi et al., n.d.) [31] | SD | 25 | 77.00 | 85.80 | 3.54 | 2.49 | High |
| 25 | D-7 | (Suningsih, 2020) [32] | SD | 30 | 37.60 | 68.37 | 4.36 | 2.14 | High |
| | | | | | | | | **2.69** | High |

Articles used as samples for higher education are labeled with codes (A-1 to A5). The distribution of data can be seen in Figure 1.

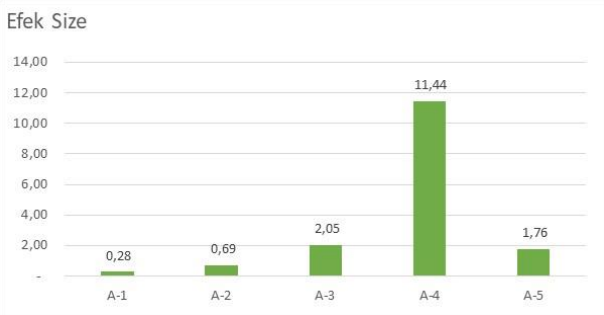


**Figure 1.** The Effect of Learning Videos on Student Learning Outcomes on the Levels College

Two articles with medium effect size category and three articles in high category. The average effect size of the influence of learning videos on learning outcomes is 3.24. The highest effect size is in the 4th article, namely the use of learning videos via YouTube on learning outcomes, the pre-test score is 2.88 and the post-test is 28.94. Recommendation [10] is that the use of learning videos via YouTube should be considered an effective instructional media in developing learning.

### Effect Analysis of SMA/SMK/MAN Level Size

The influence of learning videos on student learning outcomes at the SMA/SMK/MAN level uses a sample of 10 articles labeled B-1 to B-10. The distribution of effect sizes can be seen in Figure 2. Figure 2 shows that the distribution of effect sizes is not too different, namely in the range of 1.13 to 4.41, with an average effect size of 3.93 (high category). The videos implemented in the 10 high school level articles are in the form of animated videos, videos with the help of the MYOB application, and videos uploaded to YouTube. Research using control class and experimental class.

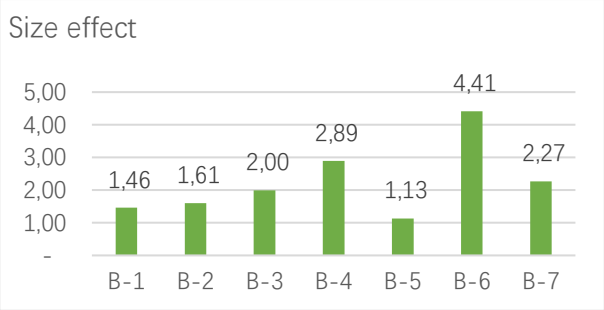


**Figure 2.** Effect of Learning Videos on Student Learning Outcomes at MA/SMK/MAN level

All articles that were sampled to analyze the effect size at the SMA/SMK/MAN level concluded that video-assisted learning resulted in higher student learning outcomes than without using video learning.

### Effect Analysis of Junior High School Level Size

The meta-analysis of the effect of learning videos on junior high school student learning outcomes involves 3 sample articles, as shown in Figure 3.

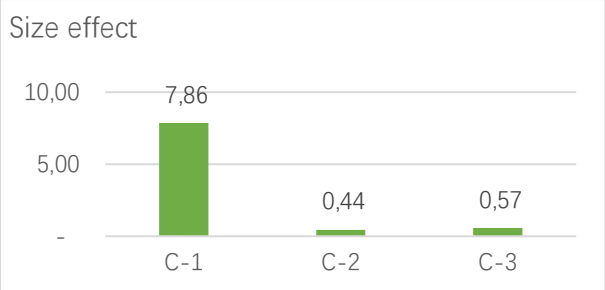


**Figure 3.** The Effect of Learning Videos on Student Learning Outcomes at the Middle School Level

The average effect size for the junior high school level is 2.96 (high category). The biggest impact of using videos is research conducted by (Iwantara, Sadia, and Suma 2014), his research reveals, the use of videos through the YouTube channel has a significant impact on improving learning outcomes. The use of video has the same impact as the use of real media in science lessons.

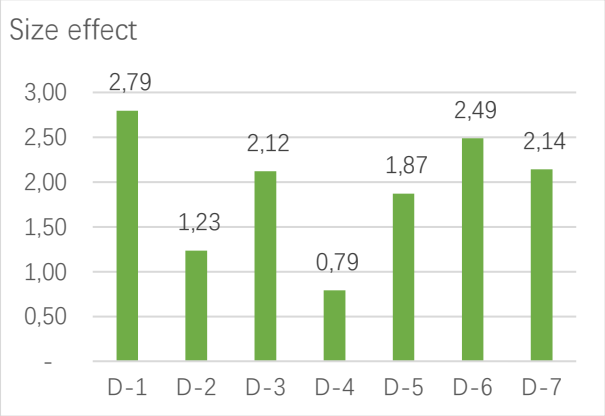


**Figure 4.** Effect of Learning Videos on Student Learning Outcomes at Elementary School Level

This is different from the junior high/high school or tertiary level, where the videos studied differ in how they are accessed by students. At the college, high school and junior high school levels, videos are not only displayed on projector screens but can be accessed via YouTube or hand-held. However, the use of video as a teaching medium at the elementary level is still in the category of high impact on learning outcomes.

### Analysis of the Effects of Size Level SD

The average effect size of the effect of video on learning outcomes at the elementary level is also in the high category, namely 1.88. The research sample uses 7 articles. The video used as teaching media is shown in class with the help of a projector.

## 4. CONCLUSION

Based on the 25 articles analyzed, the average Effect Size of the influence of learning videos on learning outcomes at the elementary school level = 1.92 (High Category), Middle School = 2.96 (High Category), High School = 2.87 (High Category), College High = 3.24 (High Category). The results of the meta-analysis carried out were that learning videos had a high effect on student learning outcomes

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