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THE EFFECTIVENESS OF ANIMATION VIDEO IN VOCABULARY LEARNING FOR ENGINEERING STUDENTS ELEVETH GRADE OF VOCATIONAL SCHOOL

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Abstract:
This research aims to investigate the effectiveness of animation video in improving students' vocabulary achievement and to explore students' responses toward the use of multimedia in vocabulary learning. The research employed a quasi-experimental design involving two eleventh-grade classes from a vocational school: the experimental class (TKJ), which was taught using animation videos, and the control class (TKR), which received conventional instruction. Richard Mayer's Multimedia Learning Theory served as the theoretical foundation, emphasizing the cognitive benefits of combining verbal and visual elements. Data were collected through pre-tests, post-tests, and classroom observations. The results of the Mann-Whitney U Test revealed a significance value of 0.000 < 0.05, indicating a statistically significant difference between the two groups. Students in the experimental group scored higher and showed more positive responses toward the learning process. The Students were more motivated, engaged, and found vocabulary easier to understand through animation. In conclusion, the use of animation video not only improves vocabulary achievement significantly but also fosters a more interactive and engaging learning environment for vocational school students.

Abstrak:
Penelitian ini bertujuan untuk menyelidiki efektivitas video animasi dalam meningkatkan pencapaian kosakata siswa dan untuk mengeksplorasi tanggapan siswa terhadap penggunaan multimedia dalam pembelajaran kosakata. Penelitian ini menggunakan desain kuasi-eksperimental yang melibatkan dua kelas kelas sebelas dari sebuah sekolah kejuruan: kelas eksperimen (TKJ), yang diajar dengan menggunakan video animasi, dan kelas kontrol (TKR), yang menerima instruksi konvensional. Teori Pembelajaran Multimedia dari Richard Mayer menjadi landasan teori, yang menekankan pada manfaat kognitif dari penggabungan elemen verbal dan visual. Data dikumpulkan melalui pre-test, post-test, dan observasi kelas. Hasil dari Mann-Whitney U Test menunjukkan nilai signifikansi sebesar 0,000 < 0,05, yang menunjukkan perbedaan yang signifikan secara statistik antara kedua kelompok. Siswa dalam kelompok eksperimen mendapatkan nilai yang lebih tinggi dan menunjukkan respon yang lebih positif terhadap proses pembelajaran. Siswa lebih termotivasi, terlibat, dan menemukan kosakata yang lebih mudah dipahami melalui animasi. Kesimpulannya, penggunaan video animasi tidak hanya

Kata Kunci:
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meningkatkan pencapaian kosakata secara signifikan, tetapi juga menumbuhkan lingkungan belajar yang lebih interaktif dan menarik bagi siswa sekolah kejuruan.

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In vocational education, mastering technical vocabulary is often a challenge for students. Conventional learning methods such as lectures and the use of textbooks tend to be considered boring. Rohmatillah (2017) stated that "Vocabulary is an important skill used for reading, speaking, writing and listening." However, traditional teaching methods are often ineffective. As expressed by Graciani & Noguera (2020), "Students are less interested in learning methods that tend to be traditional."

The decline in students' interest in learning is a challenge for teachers, especially for adolescent students. This condition makes the learning process difficult to condition. Lazarides et al. (2019) stated that "Students' enthusiasm for learning is declining more and more, especially in adolescence." Many students also admit that English is one of the subjects they don't like. This is reinforced by Šajbidorova (2018), who stated that "Lack of inspiration, perseverance and motivation are problems in students' learning levels."

In facing this problem, an innovative learning strategy is needed. One of the solutions offered is the use of technology in the teaching and learning process. Cloete (2017) stated, "Nowadays technology has an important role in life, one of which is education." Easy access to technology has opened up new opportunities in creating interesting and interactive learning.

The use of multimedia such as animated videos is one of the effective approaches in improving vocabulary mastery. Bancoro (2024) stated that "In recent years, the access of technology into the educational environment has become very easy." Through multimedia, students can experience a more dynamic learning process, which also allows teachers to create a closer and more personal learning experience (Spiteri & Chang, 2020).

Evidence of the effectiveness of multimedia in vocabulary learning is also supported by Al-Seghayer (2016), who stated that "The integration of audio-visual aids in vocabulary instruction significantly enhances learner's engagement and understanding." In addition to improving understanding, multimedia also helps students remember vocabulary. Hwang et al. (2023) added, "The incorporation of multimedia resources in vocabulary learning significantly improves students' retention rates."

This research aims to evaluate students' responses to the use of multimedia, especially animated videos, in learning industrial vocabulary at SMK Muhammadiyah 12. This research adopted an experimental approach to see the effectiveness of multimedia on vocabulary comprehension. Faizah & Gumiandri (2021) concluded that "Audiovisual media can improve student learning outcomes," which shows that this strategy has great potential in improving student learning outcomes, especially in the technical field.

METHOD

This research employs a quantitative approach with a quasi-experimental design, involving two groups of eleventh-grade engineering students at SMK Muhammadiyah 12. The experimental class receives vocabulary instruction using animation video-based multimedia, while the control class is taught through traditional methods such as lectures and textbooks. This design aims to compare the effectiveness of multimedia-based instruction on students' Vocabulary Achievement.

The theoretical foundation for this research is Multimedia Learning Theory by Richard Mayer (2009), which emphasizes the importance of presenting information through both visual and verbal channels to optimize learning. Mayer proposed the dual-channel, limited capacity, and active processing principles. As he noted, "People learn better from words and pictures than from words alone," which supports the integration of animation videos in teaching vocabulary. The dual-channel principle underscores that learners process information more effectively when both auditory and visual elements are used simultaneously.

Furthermore, the animation videos used in this study are designed according to Mayer's principles to avoid cognitive overload and encourage active learning. Mayer (2009) emphasized, "Learning occurs when learners actively select relevant information, organize it into coherent structures, and integrate it with prior knowledge." To support this, the animation videos incorporate simple narratives, contextual vocabulary, and visual examples to facilitate deeper understanding. These features are aligned with recommendations from Chiu et al. (2020), who found that proper multimedia design enhances student comprehension, especially in complex subjects.

The data in this research were collected through pre-tests and post-tests to measure students' vocabulary comprehension before and after the treatment. The instrument used was a multiple-choice test focused on industrial vocabulary relevant to the students' engineering curriculum. The results were analyzed using independent sample t-tests to determine the statistical significance of differences between the experimental and control groups. The findings aim to reveal whether animation videos significantly improve students' Vocabulary Achievement, thus validating Mayer's assertion that "The combination of text and relevant animation improves retention and transfer of learning" (Mayer, 2009).

RESULT AND DISCUSSION

The students' achievement data was obtained from their pre-test and post-test scores, which were administered in two groups: the experimental class and the control class. The type of score used to evaluate the students' vocabulary achievment was nominal. The data is presented as follows:

1. The Data of Control Class and Experimental Class

Based on data collection in previous chapter, there were three techniques showed:

a. Pre-test

To find out the level of results and obtain data on pre-test and post-test treatments on all students in the two experimental and control groups, both groups were given the same pre-test questions. Students were given pre-tests and post-tests to find out information about students' initial understanding of vocabulary comprehension, especially knowledge of engineering, where students were given questions in the form of multiple choices, matching questions, and translating as many as 20 questions. While after the students finished their pre-test, the test was calculated by researcher.

Based on the result, the total pre-test score for the control class is 1102 with an average score of 44,08. The minimum score for the pretest is 30 points and the maximum score is 50 points. While the total pretest score of the experimental class is 1110, and the average score is 44,4. The minimum score for the pretest is 30 points and the maximum score is 50 points. This indicates that a large number of students still struggle to comprehend vocabulary, particularly basic engineering.

b. Treatment

The treatment was carried out in 5 meetings, starting from mid-February to mid-April. In the experimental class, students were given treatment using animation video to improve their vocabulary skills in engineering. Meanwhile, in the control class, students were given treatment using conventional lecture methods without using animation video.

At each meeting, students in the experimental class were invited to watch animation videos related to technical vocabulary material, then they discussed and worked on related

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exercises. Meanwhile, in the control class, the teacher explained the technical vocabulary material directly and students listened and took notes on the material presented. Thus, this research can determine the effectiveness of using animation videos in improving students' vocabulary skills in the field of engineering.

c. Post-test

Finally, students were tested after completing the teaching process. The post-test was held on mid- April with 50 students present. The test contained the same format as the pre-test, with 20 questions in the form of multiple choice, matching, and translation, aimed at assessing the students' understanding of engineering vocabulary. The results of the post-test were then calculated and analyzed by the researcher to determine the effectiveness of using animation video in vocabulary learning. The post-test results were then analyzed to determine the effectiveness of using animation videos in improving students' vocabulary skills in the engineering field.

2. Data Analysis

This section presents the results of data analysis obtained from research on the effectiveness of animated videos in vocabulary learning for eleventh grade students of Engineering at SMKM 12 Sekaran. Data analysis includes descriptive statistics to describe the data in general, normality test to determine data distribution, homogeneity test to test the similarity of variance between groups, and hypothesis test to determine the significant effect of the use of animated videos on improving students' vocabulary achievement

a. Descriptive Statistic

Descriptive statistical analysis was conducted to provide an overview of the pre-test and post-test data from the experimental and control groups. These descriptive statistics include minimum, maximum, average (mean), and standard deviation values which aim to determine the extent of data distribution and differences in vocabulary learning outcomes before and after treatment is given.

Table 4.5 Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Pre Test Experiment	25	16	36	52	44,40	4,491
Post Test Experiment	25	33	54	87	67,84	8,434
Pre Test Control	25	16	36	52	44,08	4,406
Post Test Control	25	25	34	59	52,36	5,612
Valid N (listwise)	25					

Based on the results of descriptive statistical analysis, it can be seen that the pre-test score in the experimental group has a minimum score of 36 and a maximum score of 52 with an average (mean) of 44.40 and a standard deviation of 4,491. After being given treatment in the form of using animated videos, the post-test score in the experimental group increased, with a minimum score of 54 and a maximum of 87, an average of 67.84, and a standard deviation of 8.434.

Meanwhile, in the control group that was not given treatment, the pre-test score had a minimum score of 36 and a maximum score of 52 with an average of 44.08 and a standard deviation of 4,406. After the post-test, there was an increase in scores, but not as large as the experimental group, with a minimum score of 34 and a maximum of 59, an average of 52.36, and a standard deviation of 5.612. From these data, it can be seen that there was a more significant

increase in scores in the experimental group compared to the control group, which indicates a positive influence from the use of animated videos in vocabulary learning.

b. Normality test of the data

The normality test was conducted to determine whether the data obtained from the pre-test and post-test results in the experimental group and the control group were normally distributed or not. In this study, the normality test was conducted using two methods, namely Kolmogorov-Smirnov and Shapiro-Wilk, with a significance level of 0.05. If the significance value (Sig.) Is greater than 0.05, then the data is declared normally distributed. The results of the normality test are presented in the following table;

Table 4.6 Tests of Normality

	Kelas	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Hasil	Pre Tes A (Control)	,093	25	,200*	,971	25	,666
	Post Test A (Control)	,118	25	,200*	,882	25	,008
	Pre Test B (Experiment)	,079	25	,200*	,975	25	,772
	Post Test B (Experiment)	,146	25	,176	,952	25	,283

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the output table above, it is known that the degree of freedom (df) for all groups—Pre-test A (Control), Post-test A (Control), Pre-test B (Experiment), and Post-test B (Experiment)—is 25. Since the total number of samples in each group is less than 50, the researcher used the Shapiro-Wilk test to determine whether the data are normally distributed.

From the Shapiro-Wilk output, the significance value (Sig.) for each group is as follows; Pre-test A (Control): 0.666. Post-test A (Control): 0.008. Pre-test B (Experiment): 0.772. Post-test B (Experiment): 0.283. Based on these results, the interpretation is; Pre-test A (Control) has a significance value of 0.666 > 0.05, indicating the data are normally distributed.

Post-test A (Control) has a significance value of 0.008 < 0.05, indicating the data are not normally distributed. Pre-test B (Experiment) has a significance value of 0.772 > 0.05, indicating the data are normally distributed. Post-test B (Experiment) has a significance value of 0.283 > 0.05, indicating the data are normally distributed.

Three out of four data sets are normally distributed based on the Shapiro-Wilk test. Only Post-test A (Control) shows a non-normal distribution. As a result, this outcome should be taken into consideration when selecting the appropriate statistical test for hypothesis testing. If normality is not fully met, the researcher may consider using non-parametric tests as an alternative.

c. Homogeneity Test

Homogeneity test was conducted to determine whether the variances of the two groups (control and experimental class) are equal. This assumption is important in deciding the appropriate statistical test for hypothesis testing. The test used is Levene's Test of Equality of Variances with a significance level of 0.05. If the significance value is greater than 0.05, it means the data variances are homogeneous; otherwise, the data are considered not homogeneous.

Table 4.7 Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Nilai	Based on Mean	5,336	1	48	,025
	Based on Median	3,607	1	48	,064
	Based on Median and with adjusted df	3,607	1	42,806	,064

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	Based on trimmed mean	5,195	1	48	,027

Based on the table above, the significance value based on mean is 0.025, which is less than 0.05. This result indicates that the variances between the control and experimental groups are not equal or not homogeneous. Although other methods such as based on median and adjusted df show values greater than 0.05, the standard interpretation typically uses the value based on mean as the primary reference. Therefore, it can be concluded that the data do not meet the assumption of homogeneity.

Due to this result, along with the earlier normality test where one of the data sets was not normally distributed, the researcher proceeded with a non-parametric test (Mann-Whitney U Test) to test the hypothesis.

d. Hypothesis Test

This section presents the results of hypothesis testing conducted to determine whether there is a significant difference in vocabulary learning outcomes between the experimental class taught using animation videos and the control class taught without them. Since the normality and homogeneity tests indicated that the data did not meet the assumptions required for parametric testing, the researcher used a non-parametric test, specifically the Mann-Whitney U Test, as an alternative to the Independent Sample T-Test. The results of the test are presented and interpreted below.

Table 4.8 Ranks

Kelas	N	Mean Rank	Sum of Ranks
Kelas Control	25	13,92	348,00
Kelas Eksperimen	25	37,08	927,00
Total	50		

Table 4.9 Test Statistics[a]

	Hasil
Mann-Whitney U	23,000
Wilcoxon W	348,000
Z	-5,624
Asymp. Sig. (2-tailed)	,000

a. Grouping Variable: Kelas

Based on the results of the Mann-Whitney U Test, it is known that the Mean Rank value for the control group is 13.92, while for the experimental group it is 37.08. This shows that the vocabulary learning outcome scores in the experimental group are on average higher than those in the control group. The total number of respondents is 50 students, consisting of 25 students in each group.

Furthermore, from the Test Statistics table, the Mann-Whitney U value is 23.000, and the Z value is -5.624. The most important thing to note is the Asymp. Sig. (2-tailed) value of 0.000. Due to this significance value is smaller than 0.05, it can be concluded that there is a significant difference between the vocabulary learning outcomes of students who are taught using animated videos and those who are not.

In other words, the use of animated videos in vocabulary learning significantly has a better impact on improving student learning outcomes compared to learning methods without animated videos. Therefore, the null hypothesis (H_0) which states that there is no difference is rejected, and the alternative hypothesis (H_1) is accepted.

2. Discussion

This section discusses the results of the research based on the data analysis presented in the previous subchapters. The discussion aims to interpret the findings in relation to the research questions and relevant theories. It elaborates on how the use of animation video influenced students' vocabulary learning outcomes, supported by statistical evidence from descriptive analysis, normality and homogeneity tests, and hypothesis testing. Furthermore, this section connects the findings with previous studies and explain the possible reasons behind the effectiveness of animation video in the teaching and learning process.

A. The Effect of Animation Video on Students' Vocabulary Achievement

The results of this research indicate a significant difference in vocabulary learning outcomes between students who were taught using animation videos and those who were not. Based on the statistical analysis using the Mann-Whitney U Test, the significance value was 0.000, which is less than 0.05. This finding confirms that there is a significant effect of using animation video media on students' vocabulary achievement. The experimental group, which was exposed to animated learning materials, outperformed the control group in both mean rank and total score.

In the experimental class, students were more engaged during the teaching and learning process. They showed positive reactions when the animation video was played, and many students were seen more focused and actively participating in classroom activities. One student commented, *"Sir, it's easier to remember the words when I see them in a story like a cartoon. I feel like I understand it better."* This response reflects how visual and auditory elements in animation help create memorable learning experiences.

This finding aligns strongly with Richard Mayer's Multimedia Learning Theory, which posits that people learn more effectively from words and pictures than from words alone. Related to Mayer (2009), meaningful learning occurs when learners actively select relevant information, organize it into coherent mental representations, and integrate it with prior knowledge. In this case the animation video provides a combination of visual (pictures, motion) and verbal (narration or subtitles) inputs that support deeper processing of vocabulary content.

A supporting statement from an English teacher at SMK Muhammadiyah 12 Sekaran also adds weight to the finding. The teacher mentioned, *"When using regular materials like textbooks, most students get bored easily, especially in technical classes. But with animation, they become curious and actually try to pronounce and use the words."* This suggests that animation video not only improves vocabulary comprehension but also increases motivation and willingness to engage in language practice.

From a pedagogical perspective, the animation video provides contextual examples that allow learners to see how vocabulary is used in real-life-like scenarios. It transforms abstract or unfamiliar terms into concrete visuals, which is especially helpful for vocational students who are typically more responsive to practical and visual-based instruction.

The significant gain in post-test scores in the experimental group—moving from an average of 51.08 (pre-test) to 67.84 (post-test)—also reflects the effectiveness of using animated video. In contrast, the control group only showed a slight improvement, from 44.64 to 52.36, further emphasizing that traditional methods without multimedia input were less impactful.

Therefore, the results of this research not only confirm the effectiveness of animation videos in vocabulary learning but also reinforce the theoretical foundation proposed by Mayer. It supports the idea that well-designed multimedia learning environments can lead to better retention, understanding, and application of language concepts, particularly vocabulary.

b. Students' Responses Toward the Use of Multimedia in Learning Vocabulary

Students' responses toward the use of animation videos in vocabulary learning were overwhelmingly positive. The use of multimedia particularly animated videos, provided a refreshing and engaging learning experience compared to the more conventional and text-heavy instruction often used in vocational schools. This section presents an in-depth analysis of the

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students reactions and perceptions based on observation, informal interviews, and classroom engagement, supported by relevant theory.

During the implementation in the experimental class, it was observed that students became more enthusiastic and attentive. At the beginning of the treatment, several students appeared curious and excited as the animation video began. One student said, *"Wow, it's like watching a movie, but there are texts and meanings. So you can understand English while watching."* This response illustrates how animation videos capture students' interest and present vocabulary in a context they find familiar and enjoyable.

Moreover, students who usually showed little participation during traditional lessons became more engaged. They asked questions about the vocabulary used in the video, repeated the words out loud, and even mimicked the dialogue from the animation. This shift in behavior indicates that multimedia can stimulate learner motivation, particularly among vocational students who tend to prefer practical, visual, and hands-on learning.

From the perspective of the Multimedia Learning Theory by Richard Mayer (2009), this positive response can be explained by the modality and personalization principles. The modality principle states that people learn better from pictures and spoken words than from pictures and printed words, which was applied through the narration and visuals in the animated videos. The personalization principle further supports that learners respond better to content delivered in a conversational tone, which most animated videos naturally provide. This makes learning feel more personal, less formal, and therefore more accessible for students.

In one instance, a student who previously struggled with vocabulary commented, *"If I learn using videos, I will know when and how the word is used. Sometimes if I just read it, I am confused about what it means."* This confirms that contextual visualization in animation helps students understand not just the definition, but also the usage and nuance of vocabulary.

A teacher also noted that the class atmosphere changed significantly during multimedia-based lessons. He said, *"Usually they are passive, especially when asked to open a book. But when I followed the learning using visual media technology, they were immediately enthusiastic. Even those who were usually quiet started talking."* This supports the conclusion that multimedia not only increases comprehension but also encourages interaction, which is crucial for language acquisition.

CONCLUSSION

Based on the results of data analysis and discussion in the previous chapter, several conclusions can be drawn regarding the effectiveness of animation video in vocabulary learning for eleventh-grade vocational students.

First, regarding the research question: "Is there any significant effect of Animation Video on students' vocabulary achievement?" the findings revealed a statistically significant difference between the experimental and control groups. The students who were taught using animation videos showed higher post-test scores compared to those who were taught without them. The Mann-Whitney U Test result indicated a significance value of $0.000 < 0.05$, meaning the use of animation videos has a positive and significant effect on vocabulary learning. This suggests that the integration of multimedia, specifically animated videos, can effectively enhance vocabulary mastery among vocational school students.

Second, in response to the research question: "How does the students' response toward the use of multimedia in learning vocabulary?" the students responded positively to the use of animation videos. They were more motivated, engaged, and actively involved during the learning process. Many students expressed that learning through animation made vocabulary easier to understand and more enjoyable. This aligns with Richard Mayer's Multimedia Learning Theory, which emphasizes that learners benefit from the combination of verbal and visual elements, leading to improved comprehension and retention.

In summary, the use of animation video in teaching vocabulary not only improves learning outcomes significantly but also creates a more engaging and supportive learning environment for students.

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