THE EFFECTIVENESS OF VISUAL COMMUNICATION VIDEOS IN LEARNING THE PRODUCTION OF CARBON USING JENGKOL SKIN IN HIGH SCHOOL STUDENTS

Nadia Amalia[1], Irman Suherman[2]
[1,2]Program Study Sains Komunikasi, Fakultas Ilmu Sosial dan Ilmu Politik, Universitas Djuanda
Jl Tol Ciawi No 1 Kec Ciawi, Kabupaten Bogor, kode pos 16720
e-mail : nadia.amalia@unida.ac.id[1], irman.suherman@unida.ac.id[2]
corresponding author: Nania Amalia[1]

Abstract

The purpose of this research is to determine the difference the effect of the experimental exposure method using video visual communication in the experimental class and using conventional methods as a control class on the learning outcomes of vocational school students. Understanding the concept of carbon as absorbent which useful for reducing liquid waste which is harmful to the human environment, especially in facing the SDGs goals. The subjects of this research were 40 class XI vocational school students The students were divided into two classes, namely the control class and the experimental class. Learning outcomes of both classes are measured from pre-test and post-test scores as well as N-Gain. Test the hypothesis using the Independent Sample T-test. The research results show that it is practical exposure methods are more effective than conventional methods. This proven by the N-Gain value for the experimental class greater than the control class. Strengthened by results statistical test with the Independent Sample T-test where the sig value. (2 tails) < 0.05. So that The impressive method of experimentation using video displays results improves understanding, providing more insight real experience and obtain better learning outcomes. Expected Believed experimental experimenthas an influence on student learning success.
Keywords: Effectiveness, learning, student, visual communication video

Abtrak

Tujuan dari penelitian ini adalah untuk mengetahui perbedaan pengaruh metode pemaparan eksperimen menggunakan komunikasi visual video pada kelas eksperimen dan menggunakan metode konvensional sebagai kelas kontrol terhadap hasil belajar siswa sekolah kejuruan. Memahami konsep karbon sebagai penyerap yang berguna untuk mengurangi limbah cair yang berbahaya bagi lingkungan manusia, terutama dalam menghadapi tujuan SDGs. Subjek penelitian ini adalah 40 siswa sekolah kejuruan kelas XI. Siswa dibagi menjadi dua kelas, yaitu kelas kontrol dan kelas eksperimen. Hasil belajar kedua kelas diukur dari skor pre-test dan post-test serta N-Gain. Uji hipotesis menggunakan Independent Sample T-test. Hasil penelitian menunjukkan bahwa metode pemaparan praktikum lebih efektif daripada metode konvensional. Ini dibuktikan dengan nilai N-Gain untuk kelas eksperimen lebih besar daripada kelas kontrol. Diperkuat oleh hasil uji statistik dengan Independent Sample T-test di mana nilai sig. (2 ekor) < 0,05. Sehingga metode eksperimen yang mengesankan menggunakan video menampilkan hasil meningkatkan pemahaman, memberikan lebih banyak wawasan pengalaman nyata dan memperoleh hasil belajar yang lebih baik. Diharapkan Diyakini percobaan eksperimental mempunyai pengaruh terhadap keberhasilan belajar siswa.
Kata Kunci: Efektifitas, Pembelajaran, Siswa, Video Komunikasi Visual

1. INTRODUCTION

In this era of digitalization, humans are required to understand technology. One of the lessons learned in these two years, 2020 and 2021, is that the world is facing the Covid 19 outbreak, so students' learning is also required to understand what their teachers will convey. The teaching staff must also innovate in their teaching, one of which is using Visual Communication. Visual Communication is a science that studies how to communicate using creative expressions, which are applied in various visual communication media by processing graphic design elements consisting of images (illustrations), letters, colors, composition and layout Syahrul, Y. (2019). All use to convey communication messages through visual images of letters. Learning visual communication design in this paper is an action that seeks to learn knowledge through visual communication. Learning is a system with components in an effort to transform students from something more advanced in one sense Utoyo, A. W. (2020). Learning becomes an interactive communication process using visual communication, high school students will enjoy learning. This statement is clarified between communication messages, visual images, letters, color compositions to engage the brain's eyes. The involvement of moving images. Visual communication videos can see the effectiveness of students and girls in learning. Budiman, H. (2016). Based on Waluyanto's previous research, H.D. (2005) comics as a learning communication medium have similarities to visual communication, but this research does not discuss visual communication videos, so the researcher describes motion videos through visual communication with elements of letters, pictures, numbers, composition and layout.

1.1 Theoretical Framework

Learning is a complex process that occurs in every person throughout his life, the learning process occurs because of the interaction between a person and their environment Budiman, H. (2016). Therefore learning can happen anytime and anywhere. One sign that a person has learned is a change in behavior in a more positive direction in that person which may be caused by a change in the level of knowledge, skill or attitude. The learning process is also a communication process. The relation is that learning requires interaction, communication can show that the learning process is a communication process, meaning that in the process of delivering a message from someone (message source) to someone or a group of people (recipient of the message), here is the communication process chart as follows Budiman, H. (2016) ;

Message Source	Massage AnCode

The message conveyed is information (source) that is quickly converted into voice passwords, sound images and so on, via channel or TV, radio, video, film. The message received by the recipient can be received through the senses of the ears, eyes so that the message conveyed will be well received by the recipient of the message, along with the Communication Process chart.

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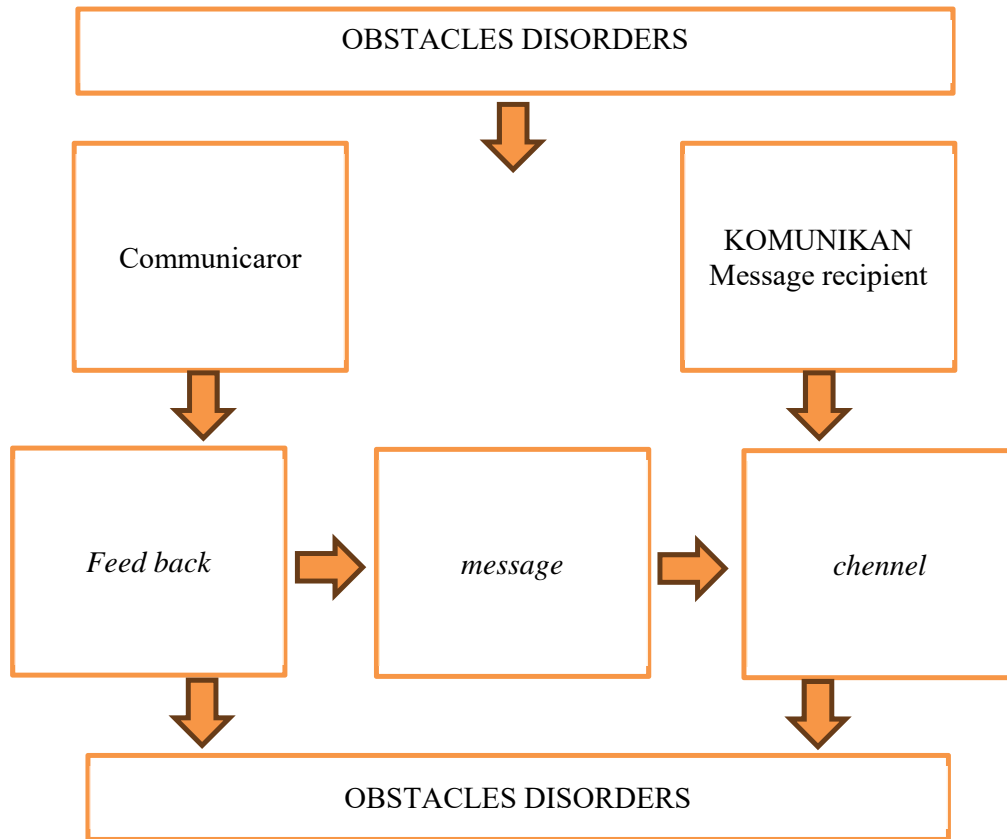
Figure 1. Diagram of Communication

As the chart above, communication is part of a system with communicator components, communicant message channel feed back and interference barriers. Feedback is positive communication Positive feedback indicates that the message was well understood, whereas negative feedback indicates the message may not have been understood correctly. To help convey this message, a channel is needed in the form of learning media. Factors that can cause messages not to be understood properly are due to noise and barriers or obstacles and distractions, this noise can be experienced by the communicator and can also occur in the communicant, in messages there are also channels. In addition to these factors, there are also several factors that can affect the effectiveness of a communication, both factors that occur at the sender and at the recipient of the message. Based on Chart 2 the researcher made the teacher and student communication process the concept of communicator/message teacher/communicant media/student.
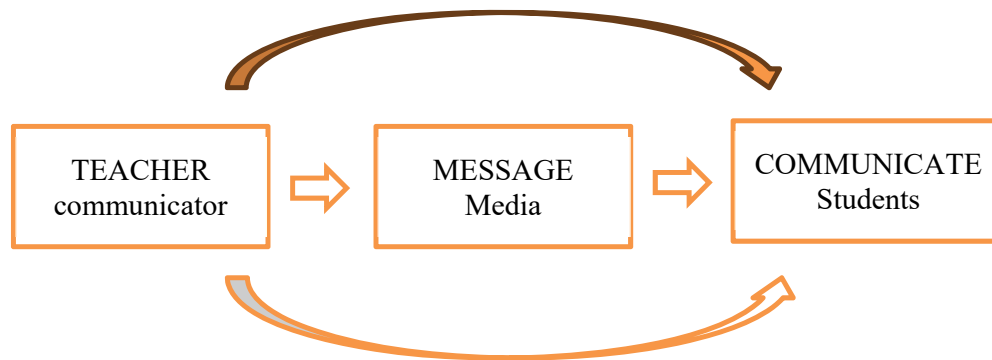
Figure 2. the teacher and student communication process

2. RESEARCH METHODS

This research uses experimental and control design. In this experimental design, students are divided into two sample classes, namely the experimental class and the control class. The implementation of this research was preceded by giving a pre-test to both classes, given treatment in Nandiyanto et al., Journal of Technical Education and Training Vol. 14 Number 2 (2022) p. 1-13 learning forms use experimental demonstration models supplemented by learning videos in the experimental class. The control class was conducted using the conventional learning model Nandiyanto, A. B. D., et, al (2022). Post-test was held to determine student learning outcomes. Based on the previous description, the assessment was carried out based on the results of the pre-test and post-test using 10 identical pre-test and post-test questions. The types of questions used are questions with right or wrong answers. In short, if the student answers the question correctly then the score is 1, and if the student answers the question incorrectly then the score is 0. This analysis has a maximum score of 100. The correct answer is then calculated using Equation (1):

$$\text{Score \%} = \frac{\text{score pretest- score postest}}{\text{maximal Score}} \times 100\%$$

To support the research results using an IQ test, with this model to determine the effectiveness of high school students in understanding Visual Communication videos in learning Carbon Making.

2.1 Research Subject

The subject of this study was the students of class XI SMA Amaliah totaling 2 classes of 40 people who were divided into two classes, the experimental class and the control class. The control class is 20 people, the experimental class is 20 people. Students were asked in the experimental class to be given different treatment, in the control group to be given presentation of material about the human environment, in the teaching session students were asked to fill out pretest questions to identify their knowledge of the human environment. In the second session, students were asked to watch a visual communication video about the human environment, then students were asked to

return to filling out the post-test questions. Summary of teaching presentation in Table 1.

Tabel 1. Summary of Teaching Delivery Methods

Delivery Method	Description	Role action
Pre-teaching	Pre-test	Student
Pengiriman conten	Penyajian materi	Guru
Pra-teaching	Post-test	Student

In the Experiment session group, teaching began with a pretest. Then students watch the Visual Communication Video in Figure 1-9, students not only watch but are directed to observe the process, writing, and images used, identify the process for making bioplastics, and identify the bioplastics produced. After that, students were asked to fill in post-test questions. The end of the session closed with a question and answer session to conclude the learning. A summary of the treatment group learning is presented in Table 2.

Figure 2. Type of Living Environment

Figure 3. Kinds of waste

Figure 4. Waste Treatment Methods

Figure 5. Solid waste processing

Figure 6. Carbon Processing Process

Figure 7. Carbon Processing video

Figure 8. Carbon Processing video

Figure 9. Carbon refinement

Figure 10. Absorbent Process

Table 2 Summary of Teaching Delivery Methods

delivery method	description	role action
pre-teaching	pre-test	student
pengiriman konten	penayangan video komunikasi visual	guru
pra-teaching	post-test	student

2.2 Data Analisis

Equation (2) states the N-Gain to understand the increase in student understanding:

$$N - Gain = \frac{((post-test\ score)-(pre-test\ score))}{((score\ ideal)-(pre-test\ score))} \times 100$$

In table 3 shows how the value of N Gain students can understand the concepts and learning models validity test and reliability test with the intention of researchers for the accuracy of each question there are 10 questions with 40 students each question has elements of visual communication such as letters, color contrast images, validity test is on Most questions are valid and can be used, only 1 question needs to be corrected before use. The reliability of the results is shown in table 4. rcount is 0.56 which indicates a medium depth level. But all questions are still reliable to use. Then an analysis of the difficulty level of the pre-test and post-test questions was also carried out using the Rovert L. Thorndike and Elizabeth Hagen level calculations (see table 5. Table 6 shows the classification of questions based on their level of difficulty. Statistical analysis is used for the prerequisite test, namely the normality test with the skewness test to determine whether the research data is normally distributed or not. The normal curve describes a symmetrical, bell-like slope curve. The test to test differences in student learning outcomes uses an independent sample T test using SPSS ver. 24. To support the analysis, we use SPSS Ver. 24. Detailed information on using SPSS is explained in Afifah et al (2022).

Tabel 3. N-Gain index category

Limitation Category	Limitation Category
g > 0.70 Hig	g > 0.70 High
0.30 ≤ g ≥ 0.70 Moderate	0.30 ≤ g ≥ 0.70 Moderate
g < 0.30 Low	g < 0.30 Low

Tabel 5. Validity test on the item questions

Type Note	Type Note
Number of questions10 items	10 items
Number of students	40 students
Valid question number	1, 2, 3, 4, 5, 6, 8, 9, 10
Number of valid questions	9

Table 6. Reliability test on the item questions

Type Note	Type Note
rcount	0.56
Category	The level of reliability on the item questions is medium

Table 7. Difficulty level of pre-test questions

Question	Number of correct answers	Total students	Difficulty index value	Question category
1	39	40	0.975	Easy
2	18	40	0.450	Hard
3	34	40	0.850	Easy
4	34	40	0.850	Easy
5	11	40	0.275	Hard
6	33	40	0.825	Easy
7	21	40	0.525	Medium
8	22	40	0.550	Medium
9	37	40	0.925	Easy
10	38	40	0.950	Easy

Table 8 Classification and percentage of Difficulty Level

Category	Question Items	Total (items)	Percentage (%)
Easy	1, 3, 4, 6, 9, 10	6	60.0
Medium	7,8	2	20.0
Difflcult	2,5	2	20.0

3. Results and Discussion

3.1 Descriptive Analysis of Control and Experiment Class Learning Outcomes

The initial description analysis is to compare the posttest answers in the control and experimental classes (see table 9). Table 9 shows the classification of questions based on Bloom's Taxonomy. There are 2 question items (3 and 8) with the same percentage score for both classes (control class and experimental class). This shows that the understanding of the concept in the control class and the experimental class is equally good. Other question items show that the post-test score in the experimental class is higher than the control class. This increase in score indicates the influence of the use of experimental demonstration learning methods accompanied by videos on student understanding.

Table 9 – Post-test score of each item question from control and experiment classes

No	Problems	Bloom Taxonomy	Post- test Control Class Score (%)	Post- Test Expperiment Class Score (%)
1	The human environment is biotic and abiotic	C1	95	100
2	Hazardous and toxic waste in the form of liquid, gas and solid waste	C1	80	100
3	Another term for carbon is charcoal	C1	95	95

No	Problems	Bloom Taxonomy	Post- test Control Class Score (%)	Post- Test Expperiment Class Score (%)
4	Wastewater treatment can be carried out using physical, biological and chemical processing techniques	C2	95	100
5	Term liquid-phase carbon	C1	40	80
6	Liquid phase carbon is used to absorb unwanted impurities/substances in liquids	C2	85	95
7	The term for absorption	C1	60	90
8	Stages of making carbon from Pithecellobium lobatum Benth, namely sorting, drying, opening, refining and testing the carbon	C3	85	85
9	The oven of Pithecellobium lobatum Benth at 260oC for 2 hours	C3	65	100
10	Environmental waste that can be used as carbon is Pithecellobium lobatum Benth	C1	90	100

The results of the pre-test and post-test for the control class and the experimental class for the video show are shown in tables 9 and 10. Before analyzing the pre-test and post-test scores for both classes, determine the ideal score that can be achieved is 100 and the minimum score is 70. Based on table 9, in the control class there were 5 students who did not pass the pre-test. After the learning process uses conventional methods, then a post-test is carried out. Reducing the number of students who did not pass the control class to 3 students. Whereas in the experimental class based on the pre-test there were 6 students who did not pass, this number was more than the control class. After the learning process used the experimental demonstration method, the number of students in the experimental class who passed after the post test became 20 students (100%). These results show a significant increase in the experimental class given visual communication video shows. That is, there is a significant effect of the experimental demonstration method on the learning process.

Table 10. Pre-test and Post-test score of control class

No	Student code	Pre- test	Post- test	N- Gain	Category
1	A1	70	50	-0,67	Low
2	A2	40	80	0,67	Moderate
3	A3	70	70	0,00	Low
4	A4	80	100	1,00	High
5	A5	80	70	-0,50	Low
6	A6	80	90	0,50	Moderate

No	Student code	Pre- test	Post- test	N- Gain	Category
7	A7	30	50	0,29	Low
8	A8	60	90	0,75	High
9	A9	90	70	-2,00	Low
10	A10	60	30	-0,75	Low
11	A11	90	90	0,00	Low
12	A12	90	100	1,00	High
13	A13	80	90	0,50	Moderate
14	A14	80	90	0,50	Moderate
15	A15	80	80	0,00	Low
16	A16	80	90	0,50	Moderate
17	A17	80	90	0,50	Moderate
18	A18	50	80	0,60	Moderate
19	A19	80	80	0,00	Low
20	A20	80	90	0,50	Moderate
Mean Score control		72,50	79,00	0,70	
Standard Deviation		16,09	17,58	0,69	

Table 11. Pre-test and Post-test score of experiment class

No	Student code	Pre- test	Post- test	N- Gain	Category
1	X1	90	90	-0,67	Low
2	X2	80	90	0,67	Moderate
3	X3	60	100	0,00	Low
4	X4	80	90	1,00	High
5	X5	90	100	-0,50	Low
6	X6	60	100	0,50	Moderate
7	X7	20	90	0,29	Low
8	X8	60	90	0,75	High
9	X9	70	80	-2,00	Low
10	X10	70	100	-0,75	Low
11	X11	70	100	0,00	Low
12	X12	70	90	1,00	High
13	X13	50	100	0,50	Moderate
14	X14	60	90	0,50	Moderate
15	X15	50	100	0,00	Low
16	X16	70	90	0,50	Moderate
17	X17	90	90	0,50	Moderate
18	X18	100	100	0,60	Moderate
19	X19	90	100	0,00	Low
20	X20	90	100	0,50	Moderate

No	Student code	Pre- test	Post- test	N- Gain	Category
	Mean Score control	71,00	94,50	0,70	
	Standard Deviation	19,41	5,89	0,36	

Detailed data regarding the highest, lowest, minimum, ideal and average scores as well as standard deviations for pre-test and post-test in the control and experimental classes are presented in table 11. Further analysis, namely the N-Gain values in both classes, is presented in table 12 The N-gain value of learning outcomes in the experimental class was 0.70 (Medium) higher compared to the control class of 0.17 (Low). Based on the results of the N-Gain value, learning using the experimental demonstration method with Visual Communication videos is more effective in increasing understanding of the concept of carbon production for vocational school students.

Table 12. The detail score in the control and experiment classes

Data Type	Pre-test Control class	Post – test Control class	Pre test Experiment class	Post – test Experiment class
Respondent	20	20	20	20
Highest Score	90	100	100	100
Lowest Score	30	30	20	80
Ideal Score	100	100	100	100
Minimum	70	70	70	70
Average Score	72.50	79.00	71.00	94.50
Standard Deviation	16.09	17.58	19.41	5.89

Table 13. Data related to the value of N-Gain for both classes

Class	N-Gain	category
8Control	0.17	Low
Experiment	0.70	Moderate

3.2 Statistical Analysis of Control and Experiment Class Learning Outcomes

Statistical analysis was carried out to confirm the results of the learning description analysis

results in the control class and experimental class. Testing the hypothesis using the Independent Test Sample T-Test method at a significance level of 5% to determine whether or not there is an effect of the experimental demonstration method using visual communication videos on student learning outcomes. The research hypothesis is as follows:

(i) H0 = there is no difference in the gain value between the control class and the experimental class

(ii) H1 = there is a difference in the gain value between the control class and the experimental class

Table 13 shows the results of the Independent Sample T-Test. The results show that H0 is rejected and H1 is accepted because of its sign value. (2-tailed) <0.05 means that there is a significant difference between the gain scores of students in the control class and the experimental class. Based on tests The results show that the experimental demonstration method using visual communication videos is more effective, seen in a very significant increase in student knowledge.

Table 13. Independent sample t-test results

Levene's test for Equality of variance			T-test for equality of means					95% Confidence interval of the difference	
Results	F	Sig.	t	df	Sig. (2-tailed)	Mean Differenc e	std Error Differenc e	lower	upper
Equal Variance with " assumption)	5,71 4	,02 2	- 3,56 3	38	,001	-1,45000	,4070 1	- 2,2739 5	- ,6260 5
Equal variances									
With " no Assumptio n"			- 3,56 3	23,64 5	,002	-1,45000	,4070 1	- 2,2907 0	- ,6093 0

4. DISCUSSION

The results of the research show that the experimental demonstration method using video can increase the knowledge of SMK students (Prastica et al., 2021). This result is evidenced by the difference in the N-Gain value between the control class and the experimental class. The test results show that the N-gain value of the experimental class is higher than the control class. The N-gain value for the experimental class is in the medium category while the control class is in the low category. The statistical test results also show that there is a significant difference. The results of this study that the use of experimental demonstration methods with videos helps students to better understand the learning material. Video media can be operated easily and can be repeated, making it easier for students to understand the material. Apart from that, video media can also show demonstrations that are difficult for teachers to carry out (Arief, 2010).

4.1 The Effectiveness of Visual Communication Video in Learning to Make Carbon Using Jengkol Skin for High School Students

Learning outcomes are a benchmark for the results of the learning process and generally learning outcomes. At the classroom learning level, one of the efforts made by teachers to increase student learning motivation is choosing effective media, one of which is video media. Video can increase student learning motivation, because (1) video is a fun medium for students so it can arouse curiosity and enthusiasm for learning. (Irfan, et al., 2016), (2) the video has sound in the form of music, explanatory illustrations, and sounds taken from real conditions (Suryansyah & Sujarwo, 2016), so the video has its own appeal for students, (3) Videos can explain something abstract and make it seem real (Febriani, 2017), therefore videos are very effective for high school (SMA) students who are still at the concrete operational stage. These three advantages can underlie the effectiveness of using video as a medium for elementary school students. (3) video media can meet all students who have different learning characteristics, starting from students who use audio, visual or audio-visual learning methods. The three points resulting from Supryadi's research had an impact on the results of understanding the visual communication video played in the experimental class to better understand the relationship between making carbon from jengkol shells.

5. CONCLUTION

One of the visual communication videos contains elements of writing, images and contrast. As a learning medium, videos act as an introduction to information for high school teachers and female students. The ease of repeating videos and how to present information into videos is one of the media that improves students' ability to understand concepts. From the results of N-Gain, the experimental class had more understanding than the control class.

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