Impact of Visual Audio Media on Learning Results on Class XI Reaction Speed Material

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Abstract

The study aims to describe the impact of the use of audiovisual media in the form of video learning on the learning results of students at Sigi District State High School 10. The research method is quantitative research with a type of quasi-experimental research or experimental experiment with a design pretest-posttest control group design. The differences in learning results on reaction speed between experimental and control classes are shown by the results of Wilcoxon and Mann Whitney's statistical analysis tests. The results of the Wilcoxons and Mann whitney statistical analytics tests on the post-test values of experimental classes and the control classes both show the significance values Asymp.Sig.(2-tailed) = <0,000. Because of the signification values Asymp.Sig.(2-tailed) = 0,000 < 0,05. Then from the two results of these statistical analyses it can be concluded that there is an influence of the use of audiovisual media in the form of video learning on the learning outcomes of students in SMAN 10 Sigi.

Keywords: learning outcomes; speed of reaction; visual audio media

Abstrak

Penelitian ini bertujuan untuk mendeskripsikan pengaruh penggunaan media audiovisual berupa video pembelajaran terhadap Hasil belajar siswa di SMA Negeri 10 Sigi Kabupaten Sigi. Metode penelitian ini adalah penelitian kuantitatif dengan jenis penelitian quasi-eksperimen atau eksperimen semu dengan desain *pretest-posttest control group* desain. Perbedaan hasil belajar pada materi laju reaksi antara kelas eksperimen dan kelas kontrol ditunjukkan dengan hasil uji analisis atatistik Wilcoxon dan Mann Whitney. Hasil uji analisis statistik Wilcoxon dan Mann Whitney pada nilai post-test kelas eksperimen dan kelas kontrol keduanya menunjukkan nilai signifikasi Asymp.Sig.(2-tailed) = <0,000. Karena hasil nilai signifikasi Asyim.Sig.(2-tailed) = 0,000 < 0,05. Maka dari kedua hasil uji analisis statistik tersebut dapat disimpulkan bahwa terdapat pengaruh penggunaan media audiovisual berupa video pembelajaran terhadap Hasil belajar siswa di SMAN 10 Sigi.

Keywords: hasil belajar, laju reaksi, media audio visual

Introduction

Chemistry is the science that studies the structure, properties, and how matter turns into other matter. It also studies the energy that accompanies the change of matter. Chemistry has sequential, abstract, and synchronous properties. The primary objective of chemistry lessons is for students to master the chemical concepts and be able to associate them with the materials they are studying. Therefore, mastery of concepts is very important (Fadhilah et al., 2020). Macroscopic, microscopical, and symbolic representations are the three types of representations used in chemistry to explain a phenomenon. (Setiawan et al., 2020). To understand the concept as a whole, we need to understand it from a macroscopic and a microskopic point of view. As a result, students often find chemistry rather difficult to understand. (Yuliana et al., 2023).

According to Rachman, et al (2017), chemistry has the potential to enhance students' creativity and improve students' ability to think logically. But in reality, many students have trouble studying chemistry. This is because chemistry is an abstract and complex concept that requires in-depth understanding (Sariati et al., 2020). This causes chemistries to become boring, difficult, uninteresting, and even considered frightening by students. (Anisa & Yuliyanto, 2017). As a result, students tend to be unable to develop critical thinking and analytical skills, which makes students less aware of how chemistry concepts (Antara, 2022). This leads to a decrease in students' learning outcomes.

to increase student motivation and interest in learning to produce students who are innovative, creative, critical, and self-reliant that maximize learning outcomes. This clearly requires innovation; progress in the world of education requires technology as an alternative to modern learning methods. Learning media is anything that is used to convey a message and has the ability to stimulate the mind, feelings, attention, and will of the student so as to drive the learning process. (Gabriela, 2021). Based on current technological advances, learning media can be divided into four categories: (1) learning media using visual audio technology; (2) learning media which uses computer technology; (3) learning media that uses print technology and (4) learning media combining print and digital technology (Setyaningrum & Waryanto, 2017). The use of learning media must be consistent with the material to be delivered to the student and the needs of the student.

Visual audio media is a tool for communicating information or presenting messages, such as concepts, principles, or other messages, to students. Visual Audio media is available in a variety of forms, including audio, visual, and visual audio. (Barus et al., 2022). Visual audio media can encourage students to create inspiring perspectives about learning systems and the materials they are studying. By using media, learning can be done anywhere and anytime, generating better learning outcomes, saving energy and time, making learning more interactive, making it easier to understand, and making it more consistent (Puspitaningrum et al., 2022).

According to Sari (2019), the use of audio-visual or video learning media can help students understand lessons more easily. This is in line with Marzuki (2023) study that visual audio media can provide a clear picture of the human digestive system so that students understand and the learning material is not abstract. Furthermore, visual, auditorial, and kinesthetic learning styles are influenced by the use of visual audio. Visual, auditory, and Kinesthetics are composed of three multi-sensory styles of learning: vision, hearing, and movement. The advantages of using visual audio media in the teaching learning process include: teaching will attract more attention of the student thus increasing the learning motivation; the material will be clearer so that the student can understand it and allow the student to master the purpose of teaching; the method of assignment will be more varied than the teacher's verbal communication, so the student will not get bored.

Research results at SMAN 10 Sigi showed several problems, including: 1) eleventh-grade students' reaction rates are

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still low; and 2) improper use of learning media. Because of the lack of students' understanding of the reaction speed material, the students' learning outcomes are low. Based on the problems that have been described, it is very attractive for researchers to do research with the title "Impact of Visual Audio Media on Learning Results on Class XI Reaction Speed Material SMAN 10 Sigi".

Method

The study was conducted at SMAN 10 Sigi in December of the 2023–2024 academic year. This research uses a quasi-experimental approach or experimental semu. The aim is to predict the circumstances that can be achieved through actual experiments; however, there is no control or change in all the relevant variables of this research design namely the pretest-posttest control group design. (Marzuki, 2023).

Sugiyono (2010) states that a population is a generalization region consisting of: objects or subjects that have certain qualities and characteristics that the researcher defines to be studied and then concludes. The population in this study is the entire student of SMAN 10 Sigi. The sample in this research is part of the population and its characteristics. Purposive sampling is a method of sample determination that uses special consideration (Sugiyono, 2010). The

sample in this study is Class XI IPA 1 used as an experimental class with video and Class XI IPA 2 used as a control class with conventional learning.

Researchers use techniques like tests to gather data. A test is a tool or procedure used to find out or measure something according to a certain rule. In this study, 15 double-choice numerals were used to measure the pretest and posttest results. The test results are then analyzed and in the hypothesis test when the data are normally distributed and homogeneous using the t test whereas when data is not normally distributed the Mann Whitney test is performed.

Result and Discussion

This research was conducted at SMAN 10 in XI grade IPA 1 as an experiment and XI class IPA 2 as a control. There were a total of 69 students in both classes, with 35 students in grade XI IPA 1 and 34 students in class XI IPA 2. In experimental classes, video is used as a learning tool. In the control class, the material is only text with sub-chapter material about reaction speed. The material in the text includes a description of the material with text and images presented in PowerPoint. The content in the video also includes audio and video, in addition to text and pictures. The results of the statistical tests can be presented in Table 1 as follows.

Table 1
Result Statistics Descriptive

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Pretest Eksperiment	35	47	40	87	61.49	12.106
Posttes Eksperiment	35	27	73	100	85.88	9.941
Pretest Control	34	33	40	73	56.43	9.457
Posttest Control	34	40	40	80	65.43	10.533
Valid N (listwise)	34					

The results in the table above show that the minimum value of the pre-test for the experimental and control class is 40, while the maximum value for the pre test

result for the experiments and control classes is 87 and 73, and the maximum number of the post test results for the Experiments and Control classes is 100 and

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83. These results show that they have something in common. Students' learning outcomes in the experimental class increased, averaging 61.49 from pretest to 85.88 in posttest. Students' learning outputs in the control class also increased. After the descriptive statistical calculation is completed, a normality test is carried out as a prerequisite for the hypothesis test.

The normality test is carried out to determine whether the distribution of the collected data follows or approximates the Gaus normalization law. Data with a number of more than thirty digits ($n > 30$) is considered to have a normal distribution and can be considered as a large sample. (Fahmeyzan et al., 2018). Calculation of the normality test can be facilitated with SPSS. The output data from the normality test is shown in Table 2.

Table 2
Result Normality Test

	Class	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Learning Outcome	Pretest (Exp.)	.149	35	.047	.960	35	.223
	Posttest (Exp.)	.209	35	.000	.869	35	.001
	Pretest (Control)	.148	34	.057	.934	34	.041
	Posttes (Control)	.192	34	.003	.923	34	.019

[a] Lilliefors Significance Correction

The sig. values on the Kolmogorov-Smirnov and Shapiro-Wilk part tables are smaller than the significant threshold of 5% (<0.05), based on previous normality tests. So it can be concluded that this research data is not distributed normally. Therefore, parametric tests cannot be used to analyze the results, so non-parametric testing, i.e. with the Wilcoxon signed rank test technique, is used to analyse data. (Maryadi, 2020). Hypothesis test: H_0 = no influence of the use of visual audio media on student learning outcomes on reaction speed material, H_1 = there is an influence on the application of visual audiomedia on the learning outcome of students on the reaction rate material.

The Wilcoxon test is used as an alternative route for the withdrawal of hypotheses from the sample. This is done on data that is not normally distributed, which cannot be used for the test. (Sari et al., 2021).

Table 3
Result Wilcoxon Test

		N	Mean Rank	Sum of Ranks
Posttest Experiment - Pretest Experiment	Negative Ranks	0[a]	.00	.00
	Positive Ranks	33[b]	17.00	561.00
	Ties	2[c]		
	Total	35		
Posttest Control - Pretest Control	Negative Ranks	4[d]	2.50	10.00
	Positive Ranks	28[e]	18.50	518.00
	Ties	2[f]		
	Total	34		

[a] Posttest Experiment < Pretest Experiment
[b] Posttest Experiment > Pretest Experiment
[c] Posttest Experiment = Pretest Experiment
[d] Posttest Control < Pretest Control
[e] Posttest Control > Pretest Control
[f] Posttest Control = Pretest Control

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Based on the data processing of pretest and posttest data on experimental classes using Wilcoxon tests as shown in the table above, it can be seen that in the experimental class after giving video learning 33 students experienced an increase in grade and 2 students obtained a fixed grade. In the control class that did not receive video learning, there were 4 students who had a decline in scores, 28 students had an increase and 2 students had a fixed score.

Table 4

Wilcoxon Test Statistical Test Table Experimental and Control Classes Tests Statistics

	Posttest Experiment - Pretest Experiment	Posttest Control - Pretest Control
Z	-5.019[b]	-4.757[b]
Asymp. Sig. (2-tailed)	.000	.000

[a] Wilcoxon Signed Ranks Test
[b] Based on negative ranks.

Based on the above table, the results of the hypothesis (Wilcoxon) showed an Asymp. Sig. (2-tailed) value of 0,000 < 0,05, which indicates that the visual audio learning medium has an influence on the student's learning outcomes on the reaction speed of the material. Based on this result, then H_1 is accepted.

The homogeneity test is used to determine the variance (diversity) of data from two or more identical or heterogeneous groups. The homogenity test was used in this study to determine whether the data variants of the experimental class (visual audio media) and the data of the control class (conventional) are homogenous. This is one condition, but not an absolute condition, of an independent sample t-test. The results of the homogenity test analysis performed using SPSS V.25 for Windows can be seen in Table 5.

Table 5

Result Homogenity Test

		Levene Statistic	df1	df2	Sig.
Learning Outcome	Based on Mean	.021	1	67	.885
	Based on Median	.178	1	67	.674
	Based on Median and with adjusted df	.178	1	58.798	.674
	Based on trimmed mean	.061	1	67	.806

Based on the above SPSS output, the known Sig on Mean is 0.885 > 0.05, so it can be concluded that the data variants of the experimental class post-test and the data of the control class after-test are identical or homogeneous. Thus, then one of the conditions (not absolute) of the independent test sample t-test is met, but cannot be done because the data are distributed abnormally then will use alternative methods using the Mann Whitney Test.

The Mann Whitney test aims to find out whether or not there is an average difference between two unpairing samples. Therefore, the number of samples used does not have to be the same. The Mann Whitney test is part of non-parametric statistics, so it does not require normal or homogeneously distributed research data. If the research data is not distributed normally or uniformly, this test is used as a substitute for an independent t-test sample test. (Sulaiman et al., 2022).

Table 6
Result Mann Whitney Test

	Learning Outcome
Mann-Whitney U	54.000
Wilcoxon W	649.000
Z	-6.541
Asymp. Sig. (2-tailed)	.000

[a]Grouping Variable: Kelas

In the Mann Whitney test, the basis of decision-making is that the Asyimp.Sig. value < 0.05 indicates that the hypothesis is accepted, whereas the Assyimp.Sig. value > 0.05 shows that the hypothesis is rejected. Based on the results of the statistics of the test, it can be concluded that the asymp.sig. (2-tailed) value is 0.00 < 0.05, so the hypothetics are considered accepted. Therefore, it can be said that the learning outcomes of students in the experimental class are different from those in the control class. then it can be said that "there is an influence of the use of visual audio media on student learning outcomes on reaction speed material".

The research conducted by researchers in the experimental class was enthusiastically welcomed by students because it was different from the usual learning process. This is also related to the students' habits of greatly enjoying animation and video in both their learning process and daily lives. Meanwhile, the research conducted in the control class involved discussion methods and conventional learning processes, using teaching materials such as books and instructional resources.

Based on the analysis of post-test data, the students' ability to understand chemistry learning between the control class and the experimental class is quite different, although it can be observed that the control class also experienced an improvement in learning outcomes. Several factors may contribute to this occurrence. Firstly, there is a new learning atmosphere, such as a change in the subject teacher and a different teaching approach from the usual. The improvement in learning outcomes can also be influenced by the teaching media used by the teacher. The use of audio-visual media in the form of instructional videos enhances the students' enthusiasm in comprehending the concepts and materials covered in the learning content. This allows students to pay more attention to the material being studied. By employing interactive teaching media, the learning activities can transform the learning environment into a more enjoyable one. This can also enhance the students' focus on the material, improve their understanding of the content, and boost their learning outcomes (Sari et al., 2021).

Conclution

Learning activities that utilize interactive teaching media can enhance students' attention in learning, enabling them to better understand the material and improve their learning outcomes. Visual audio media in the form of video learning has an influence on student learning outcomes or it can be said that video learning can improve student thinking ability. Based on the results of the Wilcoxon signed rank test and Mann Whitney between experimental class and control class, it was concluded that learning on reactive material through video is more effective than learning through text media.

Acknowledgment

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