



RESEARCH ARTICLE

## Application of the Contextual Teaching and Learning Model Using Animated Power Point Media on Student Motivation and Learning Outcomes in Class XI High School Reaction Rate Material

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### Abstract

This research aims to test whether there is a difference in the learning outcomes of students who use the Contextual Teaching And Learning Model with the Doratoon Animation Powerpoint with the learning outcomes of students who use the Contextual Teaching And Learning Model with the Powtoon Animation Powerpoint on the Reaction Rate learning material, and to assess whether learning motivation students who use the Contextual Teaching And Learning Model with Doratoon Animation power points compared to the learning motivation of students who use the Contextual Teaching And Learning Model with Powtoon Animation power points on Reaction Rate learning materials and aims to find out whether there is interaction between models and media on students' final motivation in determining student learning outcomes in reaction rate learning material in class XI Science at SMA Negeri 1 Binjai - Langkat. The samples used were two classes selected by random sampling and classes XI IPA 1 and XI IPA 3 were selected. Hypothesis testing was carried out in two ways, namely the paired t test and the one way anova test. In the hypothesis test, the value of learning outcomes obtained a sig value of  $0.001 < \alpha = 0.05$  so that  $H_0$  was rejected and  $H_a$  was accepted, so it was proven that learning outcomes were higher in classes that used the contextual teaching and learning model with Doratoon animated power point media. In terms of motivation, a significance value of 0.049 is produced, which is smaller than  $\alpha = 0.05$ , so  $H_a$  is accepted and  $H_0$  is rejected, which shows that learning motivation is higher in classes taught using the contextual teaching and learning model with Doratoon animated power point media. In the interaction test, a significance value of 0.004 was obtained, which indicates a value  $<$  of  $\alpha = 0.05$  so that  $H_a$  is accepted and  $H_0$  is rejected, so there is an interaction between the model and the media on students' final motivation in the reaction rate material.

### Keywords

Contextual Teaching and Learning; Reaction rate; Doratoon; Powtoon; Learning outcomes; Motivation to learn;

## INTRODUCTION

Education is the most basic part of a country, so the country must try various ways to improve the quality of education (Masrita, et al. 2022). In the digital era like today, which carries the development of industry 5.0, it has an impact on the use of high technology for society, one of which is the education sector. Education consists of several sciences studied at each level of education, one of which is chemistry. Chemistry is a level of knowledge at the high school education level (Kartini and Putra, 2021). Chemistry is a science that studies matter, its properties, structure, changes/reactions and the energy that accompanies these changes (Kartini and Putra, 2022., Ningrum and Lutfi, 2019., Yuanita, et al, 2022). and is a science with an important role in everyday life and in the development of knowledge and technology (Yuanita, et al. 2022).

Describing phenomena in chemistry can be done in various ways, for example by practice, using teaching aids, teaching materials or learning media (Ramadani et al. 2020). However, in reality there are still many students who experience difficulties when studying chemistry. Students' difficulty in

understanding chemistry learning is because chemistry is an abstract and complex concept that requires a deep understanding to learn it. Some of the difficulties experienced by students in studying chemistry tend to be caused by students not knowing how to study, having difficulty connecting concepts, and requiring the ability to utilize logic, mathematics and language skills. One indicator of learning difficulties among students is the low learning outcomes obtained by students (Sariati, et al., 2020; Muderawan et al., 2019). According to (Yuanita, et al. 2022). Several factors inhibiting students from understanding chemistry material are caused by students' low understanding due to inappropriate learning models. This causes students to not be able to maximally apply their learning results to everyday life, or in other words, it is still only limited to theory.

Other problems are also influenced by the ongoing learning process, namely they can be influenced by learning media. The success of a learning process also depends on facilities and infrastructure that are in accordance with the completeness of the media used so that the message conveyed in learning is more optimal (Wahyudianto, and Prapanca, 2023., Inawati and Puspasari, 2021). Another factor is also an internal influence on students, namely, the lack of application of learning models by teachers makes students less motivated and less active when learning. When students have motivation and interest in learning, it will encourage them to study to prepare themselves. However, when students do not have interest and motivation, they tend to be passive and lazy when learning (Nainggolan and PW, 2019).

Based on the results of observations and interviews with one of the Chemistry Teachers at SMA Negeri 1 Binjai - Langkat, student learning outcomes, especially chemistry learning, showed data showing low student scores so that many students did not meet the KKM scores. The Minimum Completeness Criteria (KKM) applied at SMA Negeri 1 Binjai – Langkat is 75. However, around 85% of the class prioritize work over studying. In essence, in chemistry learning, an activity is really needed that involves students being active, able to think critically and creatively in solving a problem, because not all chemistry lesson material presented by the teacher can be understood by students if it is only delivered through lectures. Based on this, this research was created to see the application of the contextual teaching and learning model using animated power point media to see learning outcomes and motivation in class XI of SMA Negeri 1 Binjai - Langkat.

## METHODS

This research was carried out at SMAN 1 Binjai – Langkat which is located on Jalan Yos Sudarso, Sukamakmur, Kec. Binjai, Kab. Langkat Prov. North Sumatra. The research was carried out from September to December 2023. The research was carried out in 4 meetings and each meeting lasted for 2 class hours. This research is experimental research with a True Experimental Design research approach. The population used in this research is Class XI students at SMAN 1 Binjai Langkat with a sample of Class XI Science students consisting of XI Science 1 to I was taught using the Contextual Teaching and Learning learning model assisted by Doratoon animated power point media, while those used as experimental classes II were taught using the Contextual Teaching and Learning learning model assisted by Powtoon Animated Power Point Media. In both classes, students will be taken purposively from the experimental and control classes who have similar initial knowledge and motivation obtained from the results of the pretest and student initial motivation questionnaire.

This research was carried out as experimental research which aims to see whether there is an influence as a result of the learning applied to students. The research design used was a pretest–posttest control group design where the sample was divided into two sample groups as follows:

Kelas	Pretes	Perlakuan	Posttest
Eksperimen	$T_1$	X	$T_2$
Kontrol	$T_1$	Y	$T_2$

Information:

$T_1$  = pretest

$T_2$  = posttest

X = Treatment with the Contextual teaching and Learning model with Doratoon animated Power point media  
 Y = Treatment with the Contextual teaching and Learning model with Powtoon Animation Power point media

The data collection technique in this research was carried out in the following way, namely:

1. Pretest, pretest is carried out for the Contextual teaching and learning model with the help of animated power point media.
2. Interview, to find out the teaching models and media that the teacher applies in learning
3. Posttest, to see learning results after applying the Contextual teaching and learning model with the help of animated power point media.
4. The results of learning about reaction rate material after implementing the Contextual teaching and learning model with the help of animated PowerPoint media are seen through written exam test scores whose validity and reliability have been tested.
5. Questionnaire Student motivation questionnaire to determine student learning motivation

The research instruments that will be used in this research are test and non-test instruments. The test instruments used are pre-test and post-test questions and the non-test instruments are student motivation questionnaires.

## RESULTS

Data analysis on research results was carried out using four tests, namely normality, homogeneity, hypothesis and N - Gain tests with pretest and posttest values. In the analysis of normality, homogeneity and hypothesis tests, the SPSS 29 program was used.

### A. Normality Test

The data normality test uses the SPSS 29.0 program using the Shapiro Wilk test with a significance level of  $\alpha=0.05$  and data is said to be normal if the significance value exceeds the  $\alpha$  value ( $\text{Sig} > \alpha$ ).

Table 1. Experimental Pretest Normality Test Results

	Tests of Normality					
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest Eksperimen I	.140	33	.099	.958	33	<b>.232</b>
Posttest Eksperimen I	.150	33	.057	.952	33	<b>.155</b>
Pretest Eksperimen II	.144	33	.081	.961	33	<b>.270</b>
Posttest Eksperimen II	.143	33	.085	.940	33	<b>.067</b>

a. Lilliefors Significance Correction

Based on the results of the normality test obtained in the table data, it can be seen from the learning results of the Experiment I class on the post-test score with the animated Power point learning media Doratoon, the significance was obtained at 0.155 and the learning results for the Experiment II class on the post-test score with the Powtoon animated Power point learning media obtained a significance of 0.067 which means that the two significance values for Experimental classes I and II have values that are greater than the value of  $\alpha=0.05$ , so that both of them have normally distributed data acquisition.

Table 2. Motivation Normality Test Results

Tests of Normality			
	KELAS	Shapiro-Wilk <sup>a</sup>	
		df	Sig.

Motivasi Belajar Kimia	Motivasi Awal Kelas Eksperimen I	33	<,001
	Motivasi Akhir Kelas Eksperimen I	33	.176
	Motivasi Awal Kelas Eksperimen II	33	.024
	Motivasi Akhir Kelas Eksperimen II	33	.435

In the results of the Motivation normality test, it can be seen that the final motivation significance value of the Experiment I class was 0.176 and the final motivation significance value of Experiment II was 0.435, which shows that the significance value exceeds the value of 0.05 so that the motivation value data is normally distributed.

#### B. Homogeneity Test

The data homogeneity test was carried out using post-test scores to see that the sample used came from a homogeneous sample. The homogeneity test was carried out using the Levene test with the help of SPSS 29.0 for windows with the condition that the significance value was  $\alpha=0.05$ .

Table 3. Homogeneity Test Results

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Hasil Belajar Kimia	Based on Mean	.027	1	64	.870
	Based on Median	.011	1	64	.917
	Based on Median and with adjusted df	.011	1	63.977	.917
	Based on trimmed mean	.008	1	64	.930

Based on the table, it can be clearly seen that the significance value based on the mean stated in the chemistry learning results is 0.870, which shows a greater significance value compared to the value of 0.05, so it can be said that the data obtained from the chemistry learning results in the Experiment I and Experiment II classes are homogeneous data.

#### C. N – GAIN TEST

The N – gain test in this study was calculated using Microsoft Excel with a formula to find the g value. in the N – gain test we can see the effectiveness and category of grades obtained by students. The N – gain test results can be seen in table 4 below.

Table 4. N-Gain Test Results

Kelas	N – Gain Score	Intepretasi	N – Gain Persen	Tafsiran Efektivitas
Kelas Eksperimen I	0,68	Sedang	68,36%	Cukup Efektif
Kelas Eksperimen II	0,67	Sedang	67,09%	Cukup Efektif

Based on the table, it can be seen that the N gain score obtained in experimental classes I and II shows that the g value category is moderate and quite effective in using Doratoon media in learning in experimental class I, while in Experiment II class it is quite effective in using Powtoon media in learning chemistry material. reaction rate.

#### D. Hypothesis Test

The hypothesis test or what is called the t test used is the paired sample t test to see two samples that are the same but have different treatments. Hypothesis testing was carried out using the SPSS 29.0 program with a significance level value of 0.05, where if sig < 0.05 then HO is rejected and Ha is accepted.

Table 5. Experimental Pretest Hypothesis Test Results

Paired Samples Test						
		Paired Differences	t	df	Significance	
		95% Confidence Interval of the Difference			One-Sided p	Two-Sided p
		Upper				
Pair 1	Pretes Eksperimen I - Posttes Eksperimen I	-46.859	-21.889	32	<,001	<,001
Pair 2	Pretes Eksperimen II - Posttes Eksperimen II	-44.466	-21.001	32	<,001	<,001

Tabel 6. Hasil Uji Hipotesis Motivasi

Paired Samples Test						
		Paired Differences	t	df	Significance	
		95% Confidence Interval of the Difference			One-Sided p	Two-Sided p
		Upper				
Pair 1	Motivasi awal Eksperimen I - Motivasi Akhir Eksperimen I	.475	-1.703	32	.049	.098
Pair 2	Motivasi Awal Eksperimen II - Motivasi Akhir Eksperimen II	-2.143	-2.983	32	.003	.005

In this hypothesis test, a one-way ANOVA test was also used to see the interaction between media and motivation on student learning outcomes in Experiment I and Experiment II classes.

Table 6. Anova Test Results

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Motivasi Akhir	Between Groups	229.227	1	229.227	8.734	.004
	Within Groups	1679.758	64	26.246		
	Total	1908.985	65			
Hasil Belajar	Between Groups	3.409	1	3.409	.043	.837
	Within Groups	5084.848	64	79.451		
	Total	5088.258	65			

Based on data analysis obtained using the SPSS 29.0 program. In the three existing hypothesis tests, two hypothesis tests were used with the formula Sample Paired t test and two way anova test with a significance level of  $\alpha=0.05$ . Obtaining the results of hypothesis testing with paired t test samples is intended to answer the first problem formulation, namely whether student learning outcomes are higher using the Contextual Teaching And Learning Model with Doratoon Animated PPT compared to student learning outcomes using the Contextual Teaching And Learning Model with Powtoon Animated PPT in Material Reaction Rate learning. Based on the data obtained from the test results in table 4.5, the significance value  $< \alpha$  is obtained, namely 0.001, which is smaller than 0.05, so it can be said that  $H_0$  is rejected and  $H_a$  is accepted, namely student learning outcomes with the Contextual Teaching and Learning Model with Doratoon Animated PPT are better. high level of student learning outcomes using the Contextual Teaching and Learning Model with Powtoon Animation PPT on reaction rate material.

In hypothesis testing to answer the second problem formulation, namely whether student learning motivation is higher using the Contextual Teaching And Learning Model with Doratoon Animated PPT compared to student learning motivation using the Contextual Teaching And Learning Model with Powtoon Animated PPT on Reaction Rate learning materials, it is obtained The sig value is smaller than the  $\alpha=0.05$  value of 0.049 and 0.003 so it can be said that  $H_a$  is accepted and  $H_0$  is rejected which proves that student motivation with the Contextual Teaching And Learning Model with Doratoon Animated PPT is higher than student motivation with the Contextual Teaching And Learning Model with Powtoon Animation PPT. In the results of the third problem formulation hypothesis test, namely seeing whether there is an interaction between the application of the model and the media on students' final motivation in determining students' chemistry learning outcomes in the reaction rate learning material, a significant ANOVA result was obtained, namely  $0.004 < 0.05$ , which states that  $H_0$  is rejected and  $H_a$  is accepted so it can be said that there is an interaction between the application of models and media on students' final motivation in determining students' chemistry learning outcomes.

## DISCUSSION

In the average pre-test results calculated by the researchers, the average pre-test score for experimental class I was 25.0 and the average pre-test score for experimental class II was 26.9. In the data on the average pretest score, it can be seen that the average pretest score for experimental class I is smaller than experimental class II. The average initial motivation value for experimental class I was 55.36

and experimental class II was 54.76, which shows that the average initial motivation value for experimental class I was greater than the average initial motivation value for experiment II.

The series of research processes was completed by making the posttest scores of experimental class I and II students as student learning outcomes on reaction rate material and final motivation scores as a form of learning treatment results in class. The learning outcomes for the experimental class I posttest score were an average of 76.67 and for the experimental class II it was 76.21. In obtaining pretest and posttest scores, there are two tests carried out, namely the n gain test and hypothesis test. In the N gain test which was carried out to see the effectiveness of the media, the average for experiment class I was 68.38 and the experiment class II obtained an average of 67.09 with a detailed explanation as follows:

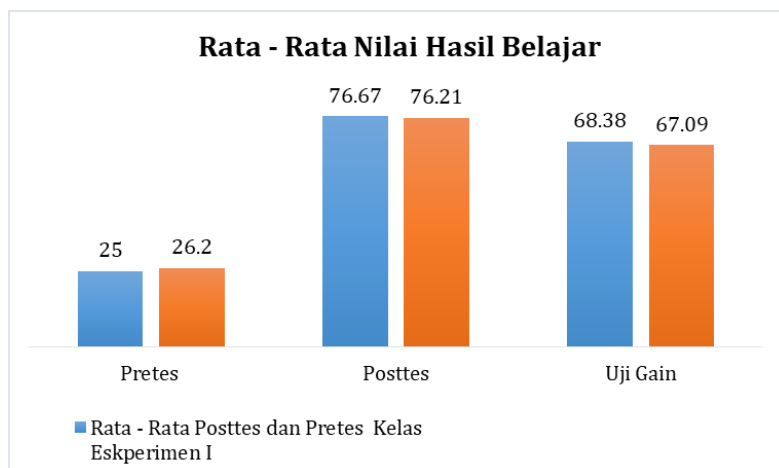
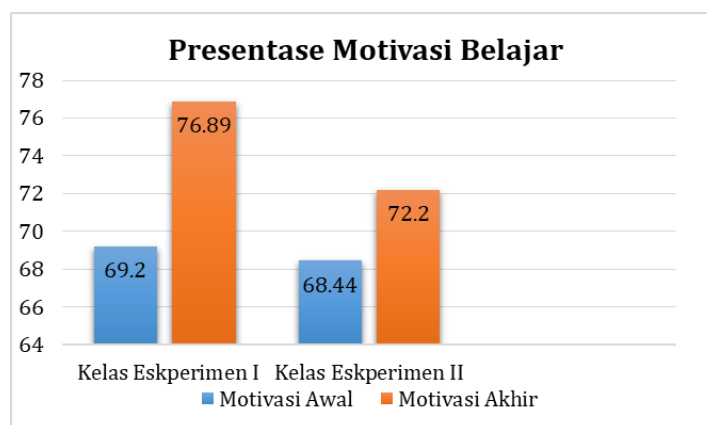


Figure 1. N-Gain Test

Based on the picture of the score results, it can be said that students who were taught with the CTL model and Doratoon animated power point media in experimental class I had higher scores compared to students in experimental class II. In this case, it can be proven that the first problem formulation shows that  $H_a$  is accepted and  $H_0$  is rejected because the value of experimental class I with Doratoon animated power point media is higher than the class taught with Powtoon animated power point media. Based on the obtained N - gain test values, the values obtained range between  $0.3 \leq g \leq 0.7$  in the medium category and are said to be quite effective because they meet the gain percent value between 56 - 75 which has a fairly effective interpretation meaning, so that the power point media Doratoon and Powtoon animations are quite effective in learning chemistry, especially reaction rates.

In the motivation test, two tests were carried out on the motivation value results, namely hypothesis testing and non-test data analysis using the motivation value percentage formula. The initial and final motivation scores for experimental class I were 69.20 and 76.89. Experimental class II had average initial and final motivation scores of 68.44 and 72.20. The acquisition data can be seen clearly in the following image:



### Figure 2. Hypothesis Testing

Based on the motivation score obtained, it can be proven in the second problem formulation where  $H_0$  is rejected and  $H_a$  is accepted because the average motivation score shows that it is higher in experimental class I so it is proven that experimental class I is taught using a contextual teaching and learning model with the help of animation media. Doratoon power points have higher learning motivation compared to experimental class II which is taught with the same model but with Powtoon animated power points as media.

In the results of testing the problem formulation using the sample hypothesis test paired t test and one way anova, a significance value was obtained that was smaller than the value  $\alpha=0.05$ . In the hypothesis test, the learning outcome value obtained sig 0.001 which is smaller than 0.05, so problem formulation one rejects  $H_0$  and accepts  $H_a$  with the conclusion that student learning outcomes are higher using the Contextual Teaching and Learning model with Doratoon animated power point media compared to student learning outcomes using the model. Contextual Teaching and Learning with Powtoon animated power point media. The results of the motivation value hypothesis test using SPSS also show that the resulting significance value is  $0.049 < 0.05$  so that  $H_0$  is rejected and  $H_a$  is accepted which shows that student motivation is higher using the Contextual Teaching and Learning model with Doratoon animated power point media compared to student motivation using the Contextual model Teaching and Learning with Powtoon animated power point media. In the ANOVA hypothesis test to answer problem formulation three, it also shows a significance value that is smaller than 0.05, namely 0.004, which concludes that  $H_a$  is accepted and  $H_0$  is rejected, which has the interpretation that there is an interaction that occurs in the application of models and media to motivation in determining student learning outcomes. in the matter of reaction rates.

### CONCLUSION

1. Student learning outcomes using the Contextual Teaching and Learning Model with Doratoon Animated Power Point Learning Media are higher than student learning outcomes using the Contextual Teaching and Learning Model with Powtoon Animated Power Point Learning Media in high school on Reaction Rate Material.

In the data from the analysis, a significant value of  $0.001 < 0.005$  was obtained in the hypothesis test and the average post-test score in the Experiment I class was 76.67 and the Experiment II class was 76.21.

2. Student learning motivation using the Contextual Teaching and Learning Model with Doratoon Animated Power Point Learning Media is higher than student learning motivation using the Contextual Teaching and Learning Model with Powtoon Animated Power Point Learning Media in high school on Reaction Rate Material.

In the results of the hypothesis test, a sig value of  $0.049 < 0.05$  was obtained and the final motivation value data obtained in experimental class I was 76.89 and in experimental class II 72.20.

3. There is an interaction between the application of the Contextual Teaching and Learning Model and Animation media on final motivation in determining student learning outcomes in high school on Reaction Rate material.

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