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The Effect of CTL Assisted by Learner Worksheets Increasing Students' Motivation and Learning Outcomes

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Abstract: The purpose of this study was to determine the effect of e-LKPD assisted CTL learning on student motivation and learning outcomes. Samples were taken by purposive sampling as many as 2 classes, namely experimental classes and control classes. The instruments used were multiple choice tests and motivation questionnaires. Data on student learning outcomes and motivation were analyzed by right-side t-test and correlation test. Correlation test to see the relationship between learning motivation and learning outcomes. The results of the cognitive t-test obtained $t_{count} > t_{table}$ ($3.401 > 1.668$) which shows H_0 is rejected and H_a is accepted, meaning that there is an effect of the CTL learning model assisted by e-LKPD on the learning outcomes of students on acid-base material. The t-test results of learning motivation obtained $t_{count} > t_{table}$ ($2.191 > 1.668$) which shows H_0 is rejected and H_a is accepted, meaning that there is an effect of CTL learning assisted by e-LKPD on student learning motivation. The correlation results obtained $t_{count} > t_{table}$ ($0.495 > 0.339$) indicate that student learning motivation is positively and significantly correlated with student learning outcomes using CTL learning assisted by e-LKPD.

Keywords: CTL Model, Worksheet Media, Student Learning Motivation, Student Learning Outcomes

INTRODUCTION

The world of education in the current era of globalization is required to prepare humans by showing their superiority, namely intelligent, creative and independent. Quality education must include two dimensions, namely academic orientation and essential skills orientation (Kholifah et al., 2020). According to (Anisa et al., 2021) at this time education in Indonesia has a ranking that is still relatively low compared to other countries in the aspect of the education system. There are several reasons why education in Indonesia is still low compared

to other countries. One of them is the influence of the lack of literacy or interest in reading in students and students and the ability to think critically (critical thinking) which is still low. According to (Astiningsih & Partana, 2020) students have difficulty understanding chemistry material and feel bored in learning chemistry, one of the factors that influence it is that students are less motivated to learn chemistry material.

Based on data from chemistry test results and interviews with one of the chemistry teachers at MAN 2 Medan Model, it is known that the scores obtained by

students still do not reach the school's minimum completion criteria (KKM). This shows that students' ability to think logically and rationally is still fairly low.

Students' lack of interest in the learning process activities is caused by limited learning facilities such as books or learning modules. In addition, the learning tools used also do not support student learning activities that lead to student learning motivation because the learning media used are only whiteboards and teaching materials. Teachers still do not use learning media that can stimulate student learning motivation to hone their abilities. As a result, student learning outcomes are low and of course also with their learning motivation (Dalimunthe & Randika, 2022).

Learning media can be utilized to raise the standard of instruction. Media for learning might be audio-visual, visual, or both. Visual media is learning media that can only be observed by the students' sense of sight, such as images. Audio media is learning media that can only be heard without being seen, such as recordings. While audio-visual media is learning media that can be observed and heard such as videos. These three types of media are included in modern media because they are supported by electronic devices (Nurgiansah, 2022). To support the increase in student motivation and learning outcomes, a learning model that is in accordance with ongoing learning is also needed. The Contextual Teaching and Learning (CTL) learning model is one alternative that can be used. CTL is an approach that emphasizes the learning process as a whole to students, which means that students are active in the learning process from finding to solving problems according to the material being studied. So that learning feels active, fun and improves students' thinking skills (Prayunisa & Mahariyanti, 2022).

Based on the description described above, the authors are interested in conducting research with the title "The Effect of Contextual Teaching and Learning Model

assisted by e-LKPD on Increasing Student Motivation and Learning Outcomes on Acid-Base Material in Class XI MAN 2 Medan Model".

LITERATURE REVIEW

Student Learning Outcomes

Learning outcomes refer to behavioral changes resulting from learning in a holistic sense that includes cognitive, emotional and psychomotor areas. The success of the learning process can be seen in the learning results of the students. Learning outcomes show the results of efforts achieved by students as long as they carry out activities at school and for educators the learning outcomes of students can be used as an assessment guideline for success in teaching and learning activities (Ai Muflihah, 2021). Meanwhile, for students, learning outcomes are information that serves to measure the level of ability or learning success, whether it has improved well or has decreased (Maretiana et al., 2022).

Student Learning Motivation

Learning motivation is the overall driving force located within students that gives rise to the intention to carry out learning activities, so that the goals desired by the learning subject can be achieved. So it can be concluded that the existence of good learning motivation will support the success of learning well too (Cahyani et al., 2020).

Learning Media

Learning media is a tool in the teaching and learning process to stimulate the minds, feelings, attention and abilities or skills of learners so that it can encourage the learning process (Ahmad Zaki, Diyan Yusri, 2020). Learner Worksheet (LKPD) is one type of printed learning media that is often used by teachers in the learning process (Dermawati et al., 2019).

(Lathifah et al., 2019) stated that LKPD has 4 functions as follows: 1) As teaching materials that minimize the role of educators, but activate students more. 2) As

teaching materials that make it easier to understand the material provided. 3) As a concise teaching material and rich in tasks to practice. 4) Facilitate the implementation of teaching to students.

Contextual Teaching and Learning Approach

According to (Dori et al., 2018) context-based learning engages students in demanding learning that activates their thinking and metacognitive skills, motivates students to learn, and encourages them to be scientifically literate. Students must be able to interpret complex new scientific information, monitor their own prior and new knowledge, and decide if or when additional information is needed to solve problems (Achdiyat & Utomo, 2018).

According to (Ruwaidah, 2022) a teacher has applied CTL in the learning process if the following 7 (seven) main components of CTL appear in the Learning Process.

1. Constructivism.

Teachers package learning into a process of "constructing" not just "receiving" knowledge. Students are encouraged to be able to build their own knowledge through active involvement in the learning process, students become the center of activity. Students are accustomed to solving problems, finding something useful for themselves.

2. Finding (Inquiry)

Discovering is a core part of CTL-based learning activities. The knowledge and skills acquired by students are not expected to be the result of remembering a set of facts, but the result of discovering themselves. Teachers should always design activities that refer to finding activities.

3. Questioning

The primary tactic of CTL-based learning is questioning. Among the advantages of asking are the following: 1) gathering data; 2) determining student

comprehension; 3) eliciting answers from students; 4) pursuing student curiosity; 5) determining what the students already know; 6) concentrating on the Basic Competencies that the teacher desires (leading question); 7) encouraging additional questions from the students; and 8) renewing student knowledge. This strategy can refer to alternative directions of questions from teachers to students or vice versa, students to students, and students to other people brought in the classroom.

4. Learning Community

This concept suggests that learning outcomes are obtained, among others, by cooperation (sharing) with others, including people outside the classroom who are members of the learning community.

5. Modeling

This indicates the existence of a role model or emulated example. Although not the main model, the teacher is one. Models can be from very competent students, running champions, badminton champions, social studies speech champions, poetry reading champions, or bring in models from outside the school, great painters, writers, poets or can also utilize relevant cassettes, CDs.

6. Reflection

Thinking back on prior actions or considering what you have recently learnt are two examples of reflection. A straightforward declaration of the lessons learnt that day, students' impressions of the lessons learned, discussion, and student notes and summaries are some examples of the types of reflection.

7. Authentic Assessment

Assessment is the "process" of collecting various data that can provide an overview of student learning development. Teachers need to know the progress of students' learning in order to ensure that

students experience the learning process well.

METHODS

This research has been conducted at MAN 2 Model Medan which is located at Jl. Williem Iskandar No.7A Sidorejo, Medan Tembung District, Medan City. This research was conducted in the even semester of the 2022/2023 academic year from January to March 2023.

The population in this study were all students of class XI IPA even semester MAN 2 Medan Model in the academic year 2022/2023 which amounted to 10 classes. The determination of the research sample was carried out using purposive sampling technique, namely as many as 2 classes, where the first class was given learning with the Contextual Teaching and Learning model assisted by e-LKPD media and the second class used conventional learning.

The research instruments used were test instruments in the form of multiple choice questions and non-test instruments in the form of learning motivation questionnaires. Before use, an instrument test was carried out to determine the level of validity and reliability of the instrument. The validity test of the items used the r point biserial test and the reliability test used the KR21 formula.

The data collection techniques used in this study were initial observations, interviews, learning outcome tests and distribution of learning motivation questionnaires and documentation. Initial observations and interviews were conducted to obtain initial information about the condition of students during chemistry learning, especially on Acid-Base material. The learning outcomes test is a test that contains questions related to acid-base material that will be given to students. The test questions in this study are written questions in the form of multiple choices. And documentation was taken as supporting data for the study including the names of students as research subjects.

Data analysis techniques consist of prerequisite tests and hypothesis tests. Data analysis techniques regarding learning outcomes obtained from pretest and posttest results that have been tested for validity and reliability. While data regarding learning motivation is obtained from the results of questionnaire analysis that has been tested for validity and reliability.

RESULT AND DISCUSSION

The results of this study by applying the Contextual Teaching and Learning model assisted by e-LKPD to determine its effect on student learning outcomes and motivation.

Data on pre-test and post-test scores that have been obtained by students are presented in the following table

Table.1 Pretest and posttest learning outcomes

Class	X		Standard Deviation		Variance	
	Pretets	Posttest	Pretest	Posttest	Pretest	Posttest
Experiment	40,14	83,82	8,89	7,31	79,12	53,49
Control	44,41	76,76	11,63	9,64	98,41	72,94

Based on the data above, the average value for the experimental class pretest value was 40.14 and for the control class was 44.41. The average posttest score obtained by the experimental class was 83.82 and the control class was 76.76. Thus, if you look at the average value of student learning scores, there is no significant difference when the class has not been given treatment, this can be seen from the average pretest score produced. There was an increase in student learning outcomes that was quite effective in the experimental class due to the learning model applied.

The learning outcomes of the 2013 curriculum consist of three assessment dimensions: cognitive assessment, affective assessment, and psychomotor assessment.

The following learning outcome data were obtained in the experimental class.

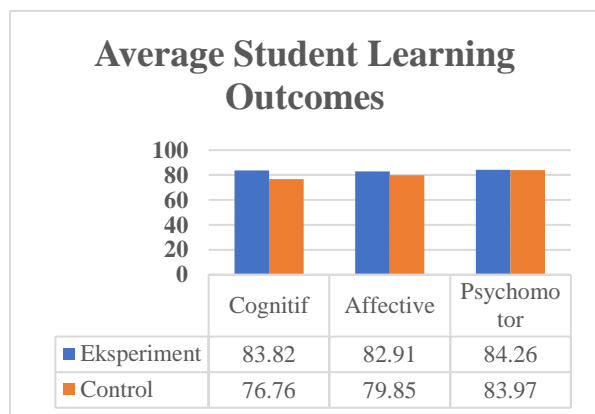


Figure 1. Diagram of average student learning outcomes

Based on the learning outcomes on cognitive, affective and psychomotor aspects, it is known that the class taught with the CTL model assisted by e-LKPD (experimental class) has higher learning outcomes compared to the control class taught with the conventional model. This shows that student learning outcomes in the experimental class are better than learning outcomes in the control class. Based on the level of significance with the right party t test analysis, the prerequisite analysis was first carried out. Based on the results of the prerequisite test, it is known that the data in the experimental class and control class. In this study, a measurement of student learning motivation was carried out by giving a questionnaire to both classes, namely the control class and the experimental class at the end of the lesson. Then the questionnaire that has been filled in by students is given a score and calculated the average. The description of student learning motivation data can be seen in table 2.

Table 2. Description of Student Learning Motivation Data

Class	Number of Student	Average
Experiment	34	81,94
Control	34	77,73

Based on table 2, it can be seen that the average student learning motivation in the two classes given different treatments. In the experimental class taught using the CTL learning model assisted by e-LKPD, the average learning motivation was 81.94. While in the control class which was taught using a conventional learning model, the average student learning motivation was 77.73.

1.1 Result of Data Analysis of Student Learning Outcomes Normalization Test

The normality test results for student learning outcomes data as a t-test prerequisite are presented in **table 3**.

Table 3. Normality Test of Learning Outcomes

Data	X^{2+}_{count}	X^2_{table}	A
Experiment	10,876	11,07	0,05
Control	9,318	11,07	0,05
Experimental Affective	10,424	11,07	0,05
Affective Control	9,151	11,07	0,05
Psychomotor Experiment	10,035	11,07	0,05
Psychomotor Control	10,756	11,07	0,05

Based on the level of significance with the right party t test analysis, the prerequisite analysis was first carried out. Based on the results of the prerequisite test, it is known that the data in the experimental class and control class are normally distributed, homogeneous, there is an increase in learning outcomes. Based on the prerequisite tests that have been carried out, the data obtained has met the requirements for hypothesis testing.

Homogeneity Test

The results of the homogeneity test for student learning outcomes data are presented in **Table 4**.

Table 4. Homogeneity Test of Learning Outcomes

Data	Class	S^2	F_{count}	F_{table}
Pretest	Experiment	79,12	1,71	1,78

	Control	135,41		
Post-test	Experiment	53,49	1,73	1,78
	Control	92,94		
Affective	Experiment	27,43	1,77	1,78
	Control	48,65		
Psychomotor	Experiment	42,2	1,45	1,78
	Control	61,21		

Based on **Table 4**, the price of $F_{count} < F_{table}$ which shows that the data on learning outcomes both cognitive, affective and psychomotor in the experimental class and control class are homogeneous.

Hypothesis Test

Hypothesis testing is done using a one-party statistical test, namely the one-party t-test. The results of the hypothesis test can be seen in **table 5** below.

Table 5. Posttest Data Hypothesis Test Result

Class Data	T_{count}	t_{table}	Description
Experiment			
$\bar{x} = 83,82$			
$S = 7,31$			
$S^2 = 53,49$	3,401	1,668	Ha accepted, Ho rejected
Control			
$\bar{x} = 76,76$			
$S = 9,64$			
$S^2 = 92,94$			

From the t distribution data obtained $t_{table} = 1.668$ while based on the calculation obtained $t_{itung} = 3.401$ that is: $3.401 > 1.668$ means that there is an effect of learning outcomes taught using the Contextual Teaching and Learning model assisted by e-LKPD on acid-base material.

1.2 Results of Learning Motivation Data Analysis

Normality Test

The results of the normality test for student learning achievement data as a t-test prerequisite are presented in **table 6**. Following

Table 6. Normality Test of Learning Motivation

Data	X^2_{count}	X^2_{table}
Experiment Class	9,046	11,07
Control Class	10,650	11,07

Based on **Table 6**, the price of $F_{count} < F_{table}$, which shows that the data on the results of learning motivation in the experimental class and control class are homogeneous.

Homogeneity Test

The homogeneity test results for student learning outcomes data are presented in **Table 7**.

Table 7. Homogeneity Test of Learning Motivation

Data	Class	S^2	F_{count}	F_{table}
Learning Motivation	Experiment	73,87	1,43	1,78
	Control	51,31		

Based on **Table 7**, the price of $F_{count} < F_{table}$ which shows the data on the results of learning motivation in the experimental class and control class are homogeneous.

Hypothesis Test

Table 8. Hypothesis Test Results of Learning Motivation Data

Class Data	T_{count}	t_{table}	Description
Experiment			
$\bar{x} = 81,94$			
$S = 8,59$			
$S^2 = 73,87$	2,191	1,668	Ha accepted, Ho rejected
Control			
$\bar{x} = 77,73$			
$S = 7,16$			
$S^2 = 51,31$			

From the t distribution data, the $t_{table} = 1.668$ is obtained, while based on the calculation, the $t_{table} = 2.191$ is obtained: $2.191 > 1.668$ means that there is an effect of learning motivation taught using the Contextual Teaching and Learning model assisted by e-LKPD on acid-base material.

Correlation Test of Student Motivation on Outcomes

Correlation analysis is used to measure how close the relationship is between learning motivation and student learning outcomes using a simple correlation test (r_{xy}) using the product moment formula.

Tabel 9. Correlation Test Between Learning Motivation And Student Learning Outcomes

Class	Class Data	r_{count}	r_{table}	Information
Eksperiment	$\Sigma X = 2786$	0,495	0,339	Ha accepted Ho rejected
	$\Sigma X^2 = 230834$			
	$\Sigma(X)^2 =$			
	7761796			
	$\Sigma Y = 2850$			
	$\Sigma Y^2 = 240750$			
	$\Sigma(Y)^2 =$			
	8122500			
	$\Sigma XY = 233640$			
	$N = 34$			

Based on table 8, it is obtained that $r_{count} = 0.495$ while r_{table} at 0.05 ($N = 34$) is 0.339, namely $0.495 > 0.339$. Because $r_{count} > r_{table}$, H_0 is rejected, which means H_a is accepted, meaning that there is a positive and significant correlation between student learning motivation and learning outcomes with the application of *the Contextual Teaching and Learning* learning model assisted by *e-LKPD* on acid-base material.

Discussion

Based on the results obtained, the average data of students' affective learning outcomes in the experimental class was 82.91 while in the control class the average result was 79.85. The average data of psychomotor learning outcomes of experimental class students is 84.26 while in the control class the average result is 83.97. Then calculations were made to determine student learning motivation in the experimental class obtained an average learning motivation of 81.94 while in the control class the average learning motivation score was 77.73.

The results of hypothesis testing using a one-sided t test or right side t for the first hypothesis obtained a value on cognitive

learning outcomes, namely $t_{count} = 3.401$ and $t_{table} = 1.668$ with a significant level of 0.05 and $db = 66$, so $t_{count} > t_{table}$ ($3.401 > 1.668$), so H_0 is rejected and H_a is accepted, which means that there is an effect of the Contextual Teaching and Learning learning model assisted by *e-LKPD* on student learning outcomes on acid-base material. This is in line with the research of (Pitnelly et al., 2021) which states that learning with the Contextual Teaching and Learning model can have an influence on improving cognitive learning in chemistry. Based on research (Sya'idah et al., 2020) states that *blended learning* assisted by *e-LKPD* has an effect on student learning outcomes on salt hydrolysis material.

The results of hypothesis II testing using one-party t test for the second hypothesis obtained $t_{count} = 2.191$ and $t_{table} = 1.668$. Because $t_{count} > t_{table}$ in accordance with the rejection of H_0 , the second hypothesis is accepted, meaning that there is an effect of using the *Contextual Teaching and Learning* model with *e-LKPD* on student learning motivation. During the learning process, it shows that students who use the CTL model assisted by *e-LKPD* are more motivated to be active in solving problems and exercises with a group of friends and students are more courageous in asking and answering questions so that there is good interaction between teachers and students and between students and students.

In line with the opinion (Nur et al., 2022) obtained that the use of CTL models has an effect on increasing learning motivation and critical thinking skills of students. Research conducted (Fikri Munafri, Halimah Husain, 2022) also found that the development of electronic student worksheets (*e-LKPD*) is feasible and can increase student learning motivation.

This third hypothesis was carried out to see the correlation test between motivation and learning outcomes of students taught with the *Contextual Teaching and Learning* model with *e-LKPD* media. The data

obtained is that $r_{\text{count}} = 0.495$ and $r_{\text{table}} = 0.339$ where $r_{\text{count}} > r_{\text{table}}$. So, there is a relationship between learning motivation and student learning outcomes using the *Contextual Teaching and Learning* model assisted by *e-LKPD* on acid-base material.

(Zhafirah & Utami, 2019) described a similar thing that the motivation and learning outcomes of students taught with the *Contextual Teaching and Learning* model assisted by *e-LKPD* were higher than those taught without the learning model. So, it is known that there is a relationship between student motivation and student learning outcomes using the CTL model assisted by *e-LKPD*.

CONCLUSION

Based on the results and discussion that the researchers have presented and described, from these results it is concluded that there is an effect of student learning motivation taught using the *Contextual Teaching and Learning* model assisted by *e-LKPD* on acid-base material. Where with the CTL learning model assisted by *e-LKPD* in the experimental class affects student learning motivation. There is an effect of student learning motivation taught using the *Contextual Teaching and Learning* model assisted by *e-LKPD* on acid-base material. Where with the CTL learning model assisted by *e-LKPD* in the experimental class affects student learning motivation. There is a correlation between motivation and learning outcomes of students taught with the *Contextual Teaching and Learning* model assisted by *e-LKPD*. This is indicated by $r_{\text{count}} = 0.339$ while $r_{\text{table}} = 0.495$, because $r_{\text{count}} > r_{\text{table}}$ then H_0 is rejected which means H_a is accepted.

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