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THE INFLUENCE PROJECT BASED LEARNING MODEL ASSISTED BY ANIMATED VIDEO ON INCREASING MOTIVATION AND LEARNING OUTCOMES FOR CLASS XI HIGH SCHOOL CHEMISTRY ON COLLOID MATERIALS

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ABSTRAK

This study aims to determine the effect of using the Project Based Learning model in learner learning motive , increasing learner learning result in colloidal material, knowing the correlation between motive and learner learning result and knowing the increase at learner learning result with the Project Based Learning model assisted by animated media in colloidal material. To achieve these objectives, the Project Based Learning model was used. The research instruments used were tests and non-tests. The results showed that there was an effect of using the based learning project model assisted by animated media in learner motive at colloidal material with a large tcount of 19.01. There is an effect of using the based learning project model assisted by aimasi media in improving learner learning result with a tcount of 6.59. There is a positive correlation between learner motive and the improvement of learning result taught using the based learning project model assisted by animated media in colloidal material with a large rcount of 0.56 and the effect of motive in learner learning result of 31.3%. There is an increase at learner learning result with the Project Based Learning model assisted by animated media in colloidal material with an average increase from 32.96 to 82.96 and obtained a gain value of 0.743 or 74.3% with a high category.

Keywords : Project based learning; colloids

INTRODUCTION

The use of conventional learning strategies is still widely used by teachers at certain schools where learners only receive information from the teacher's explanation. The media used during the learning process is also still limited, namely by lecturing, which makes learners feel bored and not enthusiastic about participating at learning (Wijayanti *et al*., 2019). Learning problems that often occur at many schools are the learning patterns applied by teachers that are not at accordance with the characteristics of the material and use more lecture methods and do not involve learners during the teaching and learning process (Syaparuddin *et al*., 2020).

The learning models prioritized at the 2013 curriculum are Inquiry Learning, Discovery Learning, Based Learning, and Project Based Learning. Based learning project model is one of the recommended learning models. By integrating the syntax of the based learning project model and experiment activities at this module can help teachers at the learning process (Dinda & Sukma, 2021). Based learning project (PjBL) is designed to be used in complex problems that require learners to investigate and understand them. (Rusmansyah *et al*., 2023).

The Project Based Learning model in colloid material expects learners to be more active at seeking and understanding knowledge through relevant collaborative projects (Uyun, 2023). By making projects, learners are able to work together with each other and respect the opinions of others (Niswara *et al*., 2019).

The Project Based Learning model is one of the learning models that requires learners to be active and help each other at making learning projects discussed by discussion and cooperation. The use of this learning model is very useful when assisted by animated video media so that learning can be used effectively at accordance with the character education aspects of the 2013 curriculum (Haratua et al., 2023). Based in research (Azura *et al*., 2022), learning with the Project Based Learning model has a good impact in the environment because based in existing problems, learners are also able to gain direct knowledge and real experience.

Based in the results of initial observations made by researchers at SMA N 18 Medan, there are still many low learner chemistry scores, especially in colloidal material. This is because the teacher still has not used the appropriate learning model and variety of learning methods. The teacher still uses the lecture method to explain the material or at can be said that the learning process is one-way. From the results of interviews with chemistry teachers, there are still many learners who have not reached the Minimum Completion Criteria (KKM) of 75. Based in the results conducted by previous researchers (Suleman, 2021), by giving experiments at 1 room using a project learning model. at can be seen that the results of the research conducted by the experiment room with the based learning project model and the order room with the conventional model have a comparison of learning result, namely 81.32% and 64.43%, which means that the learning result at learning using the project model (Project Based Learning) are higher than conventional learning. at other words, there is an effect of the Project Based Learning learning model in learner learning result at colloidal material.

METHOD

The form of this research design is pretest-postes group design. Before the application of the Project Based Learning model, researchers first tested the initial knowledge of learners in colloidal material through a pre-test. Then learners are taught using the Project Based Learning model in colloidal material to increase learners' motive and chemical learning result at learning and after applying the model, at is seen that the effect or difference at learning motive and learner chemistry learning result before and after learning using the Project Based Learning model through the post-test.

The instruments used at this study are test and non-test instruments. The test instrument is an objective test at the form of multiple choice which is arranged with 5 answer choices namely A, B, C, D, and E which totals 40 items before being validated by validators (lecturers and learners who have studied colloids) and 20 items after being validated which are used to measure learner learning result in cognitive aspects. Each item is given a score of 1 if the answer is correct and a score of 0 if the answer is wrong. Each item is arranged based in cognitive levels according to Bloom's Taxonomy ranging from C1 to C4. Meanwhile, non-test instruments will be carried out by distributing motive questionnaires and teacher interviews.

Before the data collection instruments are used at the research, the instrument is first

tested to determine the extent to which the instrument meets the requirements at terms of test validity, test reliability, difficulty level, differentiability and distractors.

For the validity of the instrument, the non-test is carried out by an expert validator who considers and analyzes the criteria and statements made by the researcher. The learning motive questionnaire is developed based in learning motive indicators. To calculate the motive score of learners can be determined by the formula:

$$Nilai\ motivasi : = \frac{Jumlah\ skor\ yang\ diperoleh}{skor\ maksimum} \times 100\%$$

The following are the criteria for the results of the learner chemistry learning motive questionnaire, namely:

Table 1 Criteria for learner learning motive

Value (%)	Roomification
80.00% ≤ MB ≤ 100%	Very High
60.00% ≤ MB ≤ 79.99%	Tall
40.00% ≤ MB ≤ 59.99%	Enough
20.00% ≤ MB ≤ 39.99%	Less
MB ≤ 19.99 %	Less than once

RESULTS AND DISCUSSION

A. RESEARCH RESULTS

1. Data Analysis of Research Instruments

This research has been carried out by first validating 40 test instrument questions to 30 learners at the form of multiple-choice consisting of five options, namely A, B, C, D, and E, covering each indicator in colloidal matter. The trial of this test instrument was carried out at SMA NEGERI 18 MEDAN.

2. Test Item Validity

In determining or calculating the validity of the test instrument, the product moment formula is used to find the calculation of each question item with N = 30, as shown at appendix 10. Questions that are declared valid have a calculation > the tab. Based in the validity test from learners at attachment 10, out of 40 test items, 24 questions were declared valid, while 16 questions were declared invalid.

3. ReliabilityTests

To calculate the reliability of the test instrument at this study, the KR-21 formula is used so that the calculation value = 0.8251 where the calculation > rTab (0.361) so that the test instrument is declared reliable

4. Test difficulty level

To determine the level of difficulty of the test, a formula is used as at attachment 12 which is tested for test instrument questions. From the results of the difficulty level test with this formula, as many as 2 questions were declared not to meet the requirements and as many as 38 questions were declared to meet the requirements according to the criteria specified at the ditentukan Dimana nilai p berkisar diantara 0,21 – 0,8.

5. Differentiation

To determine the difference test of a question, a formula is used as at attachment 11. Based in the results obtained that out of 40 questions that were tested, there were 15 questions that did not meet the requirements and 25 questions that were qualified because the D value was between 0.2 – 1.

B. Analysis of Learner Learning Outcome Data

1. Normality Test

Data that is said to be normally distributed is data that has a value of X^2calculate < X^2Tab. The results of the normality test of learner learning outcome data are presented at Table 4.1 and Table 2

Tabel 2. Pre-Test Data Normality Test

Room	X²Calculate	X²Tab	A	Information
Eksperimen	4,3	46,1	0,05	Normal
Order	3,7	46,1	0,05	Normal

Based in Tab 2 of the data normality test above, the Chi squared (*X²) of the experiment room was 4.3 while the order room was 4.14 while the Chi square value of the tab was* α 0.05; db = 32 is 46.1. Because Chi Squared is calculated(*X²) < Chi Squared Tab, at can be concluded that the data of the pretest values of the experiment room and the order room are normally distributed.*

Table 3. Post-test Normality Test

Room	X²Calculate	X²Tab	A	Information
Eksperimen	4,14	46,1	0,05	Normal
Order	2,43	46,1	0,05	Normal

Based in Table 3 of the data normality test above, the Chi squared (*X²) of the experiment room was 4.14 and the order room was 2.43 while the Chi square value of the tab at* α 0.05; db = 5 was 46.1. Because the calculated Chi Squared (*X²) < Chi Squared Tab, at can be concluded that the data of the postest values of the experiment and order roomes are normally distributed.*

2. Homogeneity Test

The homogeneity test was carried out by calculating variance, mean, Fcal and FTabel at each room with the formula:

S^2 = and F = $\frac{N\sum X^2-(\sum X)^2}{N\ (N-1)}\frac{varians\ terbesar}{varians\ terkecil}$

The calculation of the homogeneity test can be seen at Tab 4.3 and Tab 4.4.

Table 4. Pre-Test Data Homogeneity Test

Room	Variance	Fcal	FTabel	A	Information
Eksperimen	41,209	1,28	1,78	0,05	Homogeneous
Order	32,031				Homogeneous

Based in Tab 4 above, Fcal<FTabel or 1.28 < 1.78 was obtained, so at can be concluded that the pretest data between the experiment room and the order room is homogeneous.

Table 5. Post-Test Data Homogeneity Test

Room	Varians	Fcal	FTabel	A	Information
Eksperimen	32,031	1,44	1,78	0,05	Homogeneous
Order	46,371				Homogeneous

Based in Tab 4.4, $F_{cal} < F_{Tabel}$ or 1.41 < 1.78 was obtained, so at can be concluded that the pretest data between the experiment room and the order room is homogeneous. Because the data obtained has been distributed normally and homogeneously, at has qualified for hypothesis testing.

3. Homogeneity Test

The homogeneity test was carried out by calculating variance, mean, Fcal and FTabel at each room with the formula:

S^2 = and F = $\frac{N\sum X^2-(\sum X)^2}{N\ (N-1)}\frac{varians\ terbesar}{varians\ terkecil}$

The calculation of the homogeneity test can be presented at Tab 6 and Tab 7.

Table 6. Pre-Test Data Homogeneity Test

Room	Varians	Fcal	FTabel	A	Information
Eksperimen	41,209	1,28	1,78	0,05	Homogeneous
Order	32,031				Homogeneous

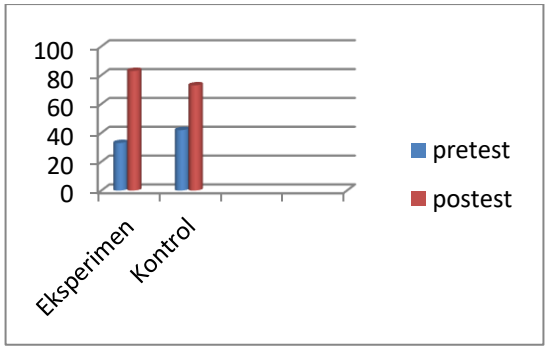
Based in Tab 6 above, Fcal<FTabel or 1.28 < 1.78 was obtained, so at can be concluded that the pretest data between the experiment room and the order room is homogeneous.

Table 7. Homogeneity Test of Post-Test Data

Room	Variance	Fcal	FTabel	A	Information
Eksperimen	32,031	1,44	1,78	0,05	Homogeneous
Order	46,371				Homogeneous

Based in Tab 7, Fcal < FTabel or 1.41 < 1.78 was obtained, so at can be concluded that the pretest data between the experiment room and the order room is homogeneous. Because the data obtained has been distributed normally and homogeneously, at has qualified for hypothesis testing.

The improvement of learner learning result can be seen at Figure 1



In **Figure 1,** at can be seen that the pretest score of the learners at the experiment room is 32.96 and the order room is 41.87, but after applying learning with based learning project assisted by animation media to the experiment room and conventional models to the order room, the learning outcome increases to 82.96 at the experiment room and 72.9 at the order room. at can be concluded that the based learning project model has the effect of increasing learner motive and learning result.

C. Analysis of Learner motive Data

1. Normality Test

Data that is said to be normally distributed is data that has a value of X^2calculate < X^2Tab. The results of the normality test of learner learning outcome data are presented at Tab 4.1 and Tab

Table 8. Learner motive Normality Test

Room	X^2Calculate	X^2Tab	A	Information
Beginning	1,25	46,1	0,05	Normal
End	5,59	46,1	0,05	Normal

Based in Tab 4.1 of the normality test of the data above, the Chi squared of the calculation *(X^2) of the initial motive room was 1.25 and the final motive was 5.59 while the Chi Square value of the Tab was* α 0.05; db = 32 is 46.1. Because Chi Squared is calculated *(X^2) < Chi Squared Tab, at can be concluded that the data in the initial motive value and final motive of the learners of the experiment room are normally distributed.*

2. Homogeneity Test

The homogeneity test was carried out by calculating variance, mean, Fcal and FTabel at each room with the formula:

S^2 = and F = $\frac{N\sum X^2-(\sum X)^2}{N\ (N-1)}$ $\frac{varians\ terbesar}{varians\ terkecil}$

The calculation of the homogeneity test can be seen and presented at Tab 9

Table 9. Pre-Test Data Homogeneity Test

Room	Variance	Fcal	FTabel	A	Information
Eksperimen	13,66	1,54	1,78	0,05	Homogeneous
Order	8,83				Homogeneous

Based in Tab 4.8 above, Fcal < FTabel or 1.54 < 1.78 was obtained, so at can be concluded that the data in initial motive and final motive of learners are homogeneous. Because the data obtained has been distributed normally and homogeneously, at has qualified for hypothesis testing.

3. Gain Test (Learner motive)

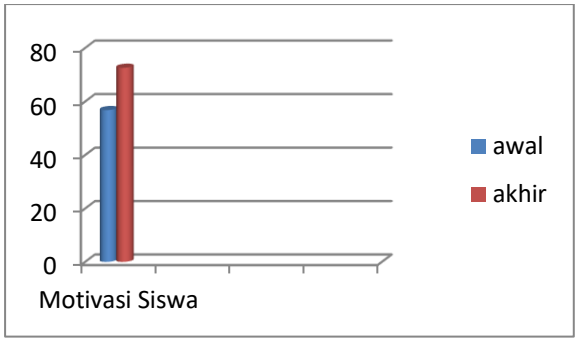
Based in the calculation of the Gain test in learner motive , the average results of the gain test are obtained as shown at Tab 10

Table 10. Increased Learner motive

Ket	Rata gain	% gain	Criterion	Information
Learner motive	0,361	36,12	g < 0,3 ; low 0.3 ≤ g ≤ 0.7 ; keep g > 0.7 ; tall	Keep

Based in Tab 10, the use of the Project Based Learning model with animation media has an effect in increasing learner motive , namely at the experiment room with an n gain value of 0.361 with a learning success percentage of 36.12% which is roomified as a medium category.

The increase at learner motive can be seen at Figure 2.



In **Figure 2,** at can be seen that the initial motive value of learners is 56.78, but after applying learning with based learning project assisted by animation media to the experiment room, the motive of learners increases to 72.58. at can be concluded that the based learning project model has the effect of increasing learner learning motive .

D. Uji Hipotesis

1. Uji Hipotesis I

The hypothesis test used at this study is a two-party test to find out the acceptance or rejection of the hypothesis. The test criteria if the tcount > tTab then the alternative hypothesis or Ha is accepted. Hypothesis test I was carried out using the formula:

$$\text{Calculation} = \frac{(\bar{X}1 - \bar{X}2)}{\sqrt{\left(\frac{S1^2}{n1} + \frac{S_2^2}{n2}\right)}}$$

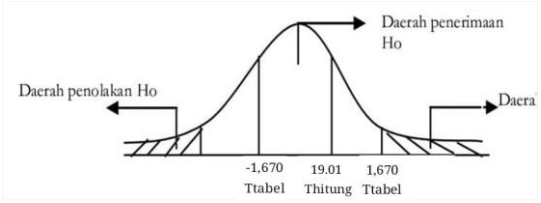
Hypothesis test I was carried out to determine the effect of the use of a based learning project model assisted by animation media in colloidal materials in improving learner learning result. The results of hypothesis 1 testing can be seen at Tab 11

Table 11. Hypothesis Testing I (Learner motive)

motive	$\bar{X}$	S	Calculation	tTab	Conclusion
Beginning	72,56	13,66	19,01	1,670	Ho was rejected and Ha was accepted
End	56,78	8,8			

Based in Tab 4.6, at is obtained that tcount = 19.01 and tTab 1.670 so that tcount > tTab, Ha is accepted and Ho is rejected. at can be concluded that there is an influence of the use of based learning project models assisted by animation media in learners' learning motive .

Ho's rejection area can be seen at Figure 3



2. Hypothesis Test II

Hypothesis II test was carried out using the formula:

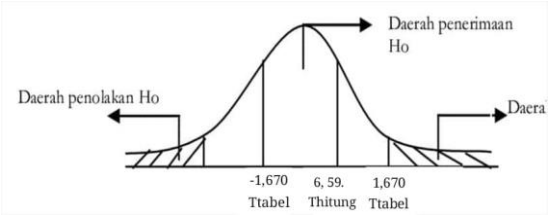
$$\text{Calculation} = \frac{(\bar{X}1 - \bar{X}2)}{\sqrt{\left(\frac{S1^2}{n1} + \frac{S_2^2}{n2}\right)}}$$

Hypothesis test II was carried out to determine the influence of the use of based learning project models assisted by animation media in learner learning result. The results of hypothesis 1 testing can be seen at Tab 12

Table 12. Hypothesis Testing II (Learner Learning Result)

Room	$\bar{X}$	S	Calculation	tTab	Conclusion
Eksperimen	82,97	32,03	6,59	1,670	Ho was rejected and Ha was accepted
Order	72,97	41,71			

Based in Tab 12, tcount = 6.59 and tTab 1.670 so that tcount > tTab, Ha is accepted and Ho is rejected. at can be concluded that there is an influence of the use of based learning project assisted by animation media in learner learning result in colloidal materials. Ho's rejection area at this hypothesis can be seen at the figure below.



3. Hypothesis Test III

Hypothesis III testing was carried out to find out if there was a correlation between

activities and learner learning result. The formula used is the product moment formula:

$$rxy = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{\{N\sum X^2 - (\sum X)^2\}\{N\sum Y^2 - (\sum Y)^2\}}}$$

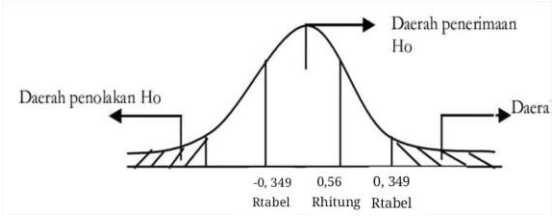
The results of the calculation according to the formula above can be seen at Tab 4.11.

Table 12. Correlation of motive with Learner Learning Result

Room	X	And	N	∑XY	∑X²	∑Y²	rxy	CD	Conclusion
Experimen	2655	2322	32	192320	221575	168764	0,56	31,3 %	There is a positive correlation

Based in the data obtained at tab 4.11 from the calculation above, at is obtained that rcal= 0.560 while the rTab at α = 0.05 (N = 32) is 0.349. Because the calculation > rTab, Ho was rejected and Ha was accepted. This means that there is a positive correlation between learner motive and the improvement of learner learning result learned with a based learning project model assisted by animation media in colloidal materials. Then at was calculated that the determination index (CD) was obtained at 0.313 or 31.3%. This means that the improvement of learner learning result, 31.3% is influenced by the motive of the learners while 68.7% is influenced by other factors.

Ho's rejection area at this hypothesis can be seen at the figure below



CONCLUSION

1. There was an effect of the use of *the based learning project* model assisted by animation media in learner motive in colloidal material with a tcount of 19.01.
2. There was an effect of the use of *the based learning project* model assisted by animation media in the improvement of learner learning result with a tcal of 6.59.
3. There was a positive correlation between learner learning motive and the improvement of learning result taught using *the based learning project model* assisted by animation media in colloidal materials with a calculation magnitude of 0.56 and the influence of motive in learner learning result of 31.3%.
4. There was an increase at learner learning result with *the Project Based Learning* model assisted by animation media in colloidal materials with an average increase from 32.96 to 82.96 and a gain value of 0.743 or 74.3% was obtained at the high category.

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