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APPLICATION OF ACTIVE KNOWLEDGE SHARING STRATEGY ASSISTED BY GOOGLE CLASSROOM APPLICATION ON STUDENT LEARNING OUTCOMES ON VIRUS MATERIAL

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Abstract: This research aims to determine the significant influence of the application of Active Knowledge Sharing learning strategies on students' cognitive abilities in Biology subjects at SMAN 1 Tanjung Brebes. This research is quasi-experimental with nonequivalent control group design. The subjects are teachers and students, while the object is the application of Active Knowledge Sharing strategies to student learning outcomes. The population was all 288 students in class X of SMAN 1 Tanjung Brebes. The sample was 36 students in class X.2 as the experimental class and 36 students in class X.1 as the control that selected by purposive sampling method. The data collection techniques used are observation, questionnaires, documentation and tests. Based on the results, it was found that the cognitive abilities of students in the experimental class that used Active Knowledge Sharing strategies were higher than those in the control class that used conventional learning. This is proven through t test which shows that that there is a difference in improving student learning outcomes between classes that use Active Knowledge Sharing strategies assisted by Google Classroom and classes that do not use Active Knowledge Sharing learning strategies at SMA Negeri 1 Tanjung Brebes in biology learning virus material.

Keywords: Google Classroom, Learning Results, Active Knowledge Sharing Strategy

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INTRODUCTION

Biology learning has objectives that include mastery of concepts, skills, and attitudes to provide a holistic understanding of the science of Biology. In this case it is explained in detail about these three aspects that, (1) Mastery of concepts, students are expected to understand and master basic concepts in biology. (2) Skills, biology learning objectives include the development of practical skills in students. (3) Attitude, Biology learning also aims to form positive attitudes towards science, such as curiosity, caution, courage, and ethics in research (Umiyati, 2014). Training cognitive aspects in *active knowledge sharing* involves developing the skills of thinking, solving problems, and analyzing information. Ways to train the cognitive aspects of *active knowledge sharing* are Group Discussions, Problem Solving, Collaborative Projects, Open Questions, Simulations and Educational Games, and Peer Evaluation. *Active Knowledge Sharing* is a strategy that emphasizes students to share and help each other in solving the questions given. Or in other words, "when there are students who are unable to answer questions or have difficulty answering, then other students who are able to answer questions can help their friends to solve the questions given" (Yolanda, 2014).

Combining *active knowledge sharing* strategy and *google classrom* application media appropriately can captivate students' attention and develop their interest (Asnawi, 2018). *Google Classroom* is a virtual learning *platform* developed by *Google* to help teachers and students organize and manage assignments, learning materials, and interactions in a virtual classroom (Sukmawati, 2022). *Google Classroom* is one of the products from *G.Suite for Education* designed to facilitate the online learning process. From the above understanding, it can be concluded that *Google Classroom* provides many benefits in the *online* learning process, especially during the *Covid-19* pandemic (Atikah, 2021). In its use, *Google Classroom is* effective in helping teachers and students organize tasks, materials, and communication in the virtual classroom (Famukhit, 2020).

Viruses are one of the materials taught in the field of science. Many students have difficulty understanding the concept of virus material. Learning difficulties faced by class X students include: (1) Lack of library facilities to support the learning process, (2) Students are less active in seeking additional explanations related to virus material that is not in the student handbook, (3) The low ability of students to remember the subject matter that has been taught. This situation will certainly cause students to be unable to absorb the subject matter properly, resulting in low student learning outcomes (Husnifa, 2016). Simon (2017) stated that students often mistake viruses for bacteria and think of viruses as prokaryotic cells. This misconception arises because both viruses and bacteria often use Latin and have similar body structures as microorganisms. This further strengthens the general view that the difficulty in learning biological material lies in the difficulty of remembering Latin names, memorizing concepts, and imagining abstract things (Syah, 2011).

METHODS

The research used is quantitative research, because the research data is in the form of numbers and analysis using statistical data. The method used in this research is the Pretest-Posttest Control Group Design research design. This Pretest-Posttest Control Group Design research design involves two classes, namely the experimental class and the control class. The experimental class is a class that obtains learning using the Active Knowledge Sharing Strategy while the control class is a class that obtains learning using Conventional learning.

The population in this study were all students of class X SMA Negeri 1 Tanjung Brebes in the 2022/2023 school year. The sampling technique in this study was purposive sampling. Purposive sampling is a sampling method in which the researcher selects a sample based on the research knowledge of the sample to be selected (Arikunto, 2013). In this study, two classes will be selected

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as sample classes. Data collection techniques and tools are using the technique of giving instruments in the form of test questions, questionnaires, and observation sheets.

Based on research regarding the AKS Strategy taken from Rosyidi (2018) references, the steps for implementing the AKS type active learning strategy are as follows :

1. The teacher provides a list of questions related to the subject matter to be taught.
2. The teacher instructs the students to answer the questions to the best of their ability.
3. Learners go around looking for friends who can help answer questions that they do not know or have doubts about. The teacher emphasizes to students to help each other.
4. The teacher organizes learners to return to their seats then check their answers. The teacher explains the question asked.
5. The answers that emerge are used as a bridge to introduce important topics from the subject matter.

Data Analysis

The following are some of the analyzes used in this research:

1. Analysis Instruments

a. Internal Consistency of Question Items

Internal consistency of test items is a measure that shows the level of validity of an institution. An instrument can say that it is consistent if it is able to measure what is desired and can reveal the variables studied accurately (Sugiyono, 2016). The internal consistency of the items in this research was carried out using construct validity and content validity. The formula used by the author in testing the internal consistency of test items is the Product Moment formula. Internal consistency of questionnaire items and items using Peurson's Product Moment correlation formula:

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{\{N\sum x^2 - (\sum X)^2\}\{N\sum Y^2 - (\sum Y)^2\}}} \quad \text{..... (1)}$$

Description:

r_{xy}	: Correlation Index Number "r" Product moment
Σx	: Sum of All X Scores
Σy	: Sum of All Y Scores
N	: Number of Subjects Tested *(Number of Cases)*
ΣXY	: The sum of the multiplication results between score X and score Y

After obtaining the r_{xy} value, it is compared with the r_{table} value. If $r_{xy} > r_{table}$ then the question item is valid/consistent, and if $r_{xy} > r_{table}$ then the question is not valid/consistent. The calculated values are consulted to the Product Moment critical price table so that it can be seen whether the correlation is significant or not. If the calculated r price is smaller than the table critical price then the correlation is not significant, if the calculated r price is greater than the table critical price then the correlation is significant or the instrument is valid (Arikunto, 2013). In this case the r value is interpreted as a correlation coefficient with the following criteria.

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Table 1. Qualification of Item Internal Consistency Coefficient

No	r score	Interpretation
1	$0,80 < r_{xy} \leq 1,00$	Very High
2	$0,60 < r_{xy} \leq 0,80$	High
3	$0,40 < r_{xy} \leq 0,60$	Medium
4	$0,20 < r_{xy} \leq 0,40$	Low
5	$0,00 < r_{xy} \leq 0,20$	Very Low
6	$r_{xy} \leq 0,00$	Invalid

Based on the instrument analysis steps regarding the Internal Consistency of Question Items according to the learning outcome variables, namely by testing the questions first, the results of the test questions that have been carried out are the results of the internal consistency of the questions for 30 questions out of the 50 questions that were tested. So in this case the researcher used a total of 30 multiple choice questions which were suitable for use according to the calculation of the internal intensity of the question items.

b. Reliability Test

Reliability is an index that shows the extent to which a measuring instrument is used twice to measure the same phenomenon and the results obtained are relatively consistent .

$$r = \left[\frac{k}{k-1}\right] \left[1 - \frac{\sum \sigma_b^2}{\sigma_t^2}\right]$$

$$\sigma_t^2 = \frac{\sum(Y^2) - \frac{(\sum(Y))^2}{N}}{N} \qquad \sigma_b^2 = \frac{\sum(X^2) - \frac{(\sum(X))^2}{N}}{N} \quad \text{..... (2)}$$

Description:

r	= reliability value
k	= many questions
N	= the number of respondents
$\sigma 2$	= total variance
$\sum \sigma 2$	= total item variance

In other words, reliability shows the consistency of a measuring instrument in measuring the same phenomenon, meaning that if an observation is made with the same measuring device more than once, the observation results remain the same.

The reliability test of the test questions in this research was carried out using SPSS version 29. with the Alpha Cronbach formula. The Cronbach's Alpha method is used to find the reliability of instruments whose scores are not 1 and 0, for example questionnaires or essay questions (Arikunto, 2013).

The level of reliability using the Cronbach Alpha method is measured based on an alpha scale of 0 to 1 and can be seen as in the following table 2.

Table 2. Reliability Level Based on Alpha Value

Alpha	Level of Reliability
0,00 – 0,40	Less Reliable
0,41 – 0,60	Quite reliable
0,61 – 0,80	Reliable
0,81– 1,00	Very Reliable

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Based on the instrument analysis steps regarding the Question Reliability Test according to the learning outcome variables, namely by testing the questions first, the results of the test questions that have been carried out get reliable results for 30 questions out of the 50 questions that were tested. So in this case the researcher used a total of 30 multiple choice questions which were suitable for use according to the calculation of the level of reliability of the question items.

c. Question difficulty level

A good question is a question that is neither too easy nor too difficult. To determine the level of difficulty of a question, you can use the formula:

$$P = \frac{B}{JS} \quad \text{..... (3)}$$

Description:
P : Difficulty index
B : The number of students who answered the questions correctly
JS : The total number of students taking the test

Based on the instrument analysis steps regarding Testing the Level of Difficulty of Questions according to the learning outcome variables, namely by Trying Out the Questions first, the results of the testing of the questions that have been carried out are the results of the difficulty level of the questions in the amount of 30 questions out of the 50 questions that were tested at a cognitive level: Very Easy, Easy Medium, Difficult, and Very Difficult. So in this case the researcher used a total of 30 multiple choice questions with the appropriate level of difficulty.

d. Discriminating power of questions

The differentiating power of the questions is intended to find out how far each question item can be answered by each student (Arikunto, 2013). The differentiating power of a test question can be calculated using the following formula:

$$D = \frac{B_A}{J_A} - \frac{B_B}{J_B} = P_A - P_B \quad \text{..... (4)}$$

Description:
D = Different power
B_A = The number of participants in the upper group who answered correctly
B_B = Many lower group participants answered correctly
J_A = Many participants from the upper group
J_B = Many lower group participants

Based on the instrument analysis steps regarding Testing the Differential Power of Question Items according to the learning outcome variables, namely by Testing the Questions first, the results of the testing of the questions that have been carried out get the results of the different power of the questions in a total of 30 questions out of the 50 questions that were tested with power levels different questions. Very good. So in this case the questions given are quite good with very good quality of question power.

2. Data analysis

Based on research needs, after testing the test instrument using instrument analysis in the form of testing the internal consistency of the question items, reliability, level of difficulty of the questions, and differentiating power of the questions, data analysis is then carried out after getting

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the research results, namely by analyzing test data, analyzing observation sheets, and analysis of student responses. Accordingly, the researcher used several data analyzes as follows:

a. Test Data Analysis

To determine whether there was an increase in student learning outcomes after being given treatment, in both the experimental and control classes the N-gain value was calculated. The N-gain score calculation is done by calculating the difference between the pretest score and the posttest score. The N-gain score value can be calculated using the Meltzer formula as follows:

$$N - Gain = \frac{\text{PostTest Score} - \text{PreTest Score}}{\text{Ideal Score} - \text{PreTest Score}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

The Ideal Score is the maximum (highest) value that can be obtained. The categorization of the N-gain score can be determined based on the N-gain value in the form of a percent (%). The division of N-gain value categories can be seen in the following table :

Table 3. Gain Score Distribution

N-gain Score	Category
g > 0,7	High
0,3≤ g ≤ 0,7	Medium
g < 0,3	Low

(Source: Meltzer, 2002)

1) Prerequisite Test

a) Normality test

The sample normality test is to test whether the distribution of the data to be analyzed is normal or not. The normality test is used if the researcher wants to know whether there are differences in the proportions of subjects, objects, events, etc., so that the next testing step can be determined (parametric or non-parametric). In this normality test, the Kolmogorov-Smirnov Test is used, which is carried out using SPSS version 29 software. The provisions for the normality test using the SPSS version 29 program are as follows:

- Significance value or probability value < 0.05, the data distribution is not normal.
- Significance value or probability value ≥ 0.05, data distribution is normal (Arikunto, 2013).

b) Homogeneity Test

The homogeneity test is intended to determine whether the variances are the same or not. Arikunto (2013) stated that if researchers are going to generalize research results, they must be sure that the groups that form the sample come from the same population. Apart from that, homogeneity testing was also carried out as a consideration in subsequent tests. This test was carried out using the Levene test with SPSS version 29. The homogeneity test formula used is as follows:

$$F = \frac{S_A^2}{S_B^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Description :

S_A^2 : The biggest variable

S_B^2 : Smallest variable

Data is homogeneous if it is significant ≥0,05

2) Hypothesis testing

Sugiyono (2016) said that a hypothesis is defined as a temporary answer to the formulation of a research problem. In statistics, testing parameters through statistics (sample data) is called

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statistical hypothesis testing. The null hypothesis can be interpreted as there being no difference between parameters and statistics, or no difference between population size and sample size.

In this research, the type of hypothesis used is a descriptive hypothesis. A descriptive hypothesis is a statement that indicates the alleged existence of significant differences in the values in a sample (Sugiyono, 2016). The statistical test used to test the hypothesis of this research is the T-test. The hypothesis test formulation used in this research uses a two-party test (Independent Sample T test), as follows:

$$H0 : \mu 1 = \mu 2$$
$$Ha : \mu 1 \neq \mu 2$$

Description:

H0 = There is no significant difference in the learning outcomes of students who apply learning with Active Knowledge Sharing assisted by the Google Classroom application on viral material

Ha = There are significant differences in the learning outcomes of students who apply learning with Active Knowledge Sharing assisted by the Google Classroom application on viral material

The criteria for making decisions on the t-test are as follows:

- If the Sig value (2-tailed) ≤ 0.05 means there is a difference at the 5% significance level (H0 is rejected, H1 is accepted)
- If the Sig value (2-tailed) ≥ 0.05 means there is no difference at the 5% level (H1 is rejected, H0 is accepted)

b. Analysis of Observation Sheets

Observation sheets are used to measure students attitudes/activities during learning by implementing Active Knowledge Sharing assisted by the Google Classroom application. The observation sheet contains six indicators of aspects of the Active Knowledge Sharing strategy learning flow. Observations were carried out during the learning process for each student. The results of these observations are then calculated as percentages and interpreted based on student activity during learning. In processing observation data, the author uses the following formula:

$$P = \frac{X}{A} \times 100\% \quad \text{..... (7)}$$

Description:

P	: Percentage for each answer ability
X	: Total score obtained
A	: Maximum score
100%	: Count standard (fixed number)

The criteria for interpreting student activity scores are as follows:

Table 4. Criteria for Interpretation of Student Activity Scores

Percentage (%)	Criteria
0% - 40%	Very less
41% - 54%	Less
55% - 69%	Enough
70% - 84%	Good
85%-100%	Very good

(Source: Arikunto, 2013)

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c. Analysis of Student Response Questionnaire Data

The student response questionnaire was used to determine student responses to the implementation of Active Knowledge Sharing assisted by the Google Classroom application which consisted of a total of 20 items with 10 positive statement items. The questionnaire in this study used a 6 point Likert scale with an interpretation value of 1= strongly disagree, 2= disagree, 3= agree, 4= strongly agree. Questionnaire data processing is carried out using the following formula:

$P = \frac{X}{A} \times 100\%$ ..... (8)

Description:

P	: Percentage for each answer ability
X	: Total score obtained
A	: Maximum score
100%	: Count standard (fixed number)

The criteria for interpreting student response scores are as follows:

Table 5. Student Response Interpretation Criteria

Percentage (%)	Criteria
0% - 40%	Very less
41% - 54%	Less
55% - 69%	Enough
70% - 84%	Good
85%-100%	Very good

(Source: Arikunto, 2013)

RESULTS AND DISCUSSION

1. Results

a. Student Activities on the Application of Active Knowledge Sharing (AKS) Strategy Assisted by Google Classroom on Virus Material

In the application of the *Active Knowledge Sharing* strategy, learning activities in the experimental class were observed using observation techniques with instruments in the form of observation sheets that have been provided. This is done to see the extent to which the AKS strategy can create active and enjoyable learning so that it can improve student achievement / learning outcomes. There are 6 indicators that become the reference in observing student learning activities in the experimental class, namely: (1) Ability to provide a list of questions in learning biology virus material (2) Ability to answer questions well (3) Ability to search for information (4) Ability to organize information (5) Ability to express opinions, and (6) Ability to formulate conclusions. Observations were carried out by two observers, which in this case the observation process was carried out in four meetings. The average observation results of student activities in 4 meetings can be seen in the figure below :

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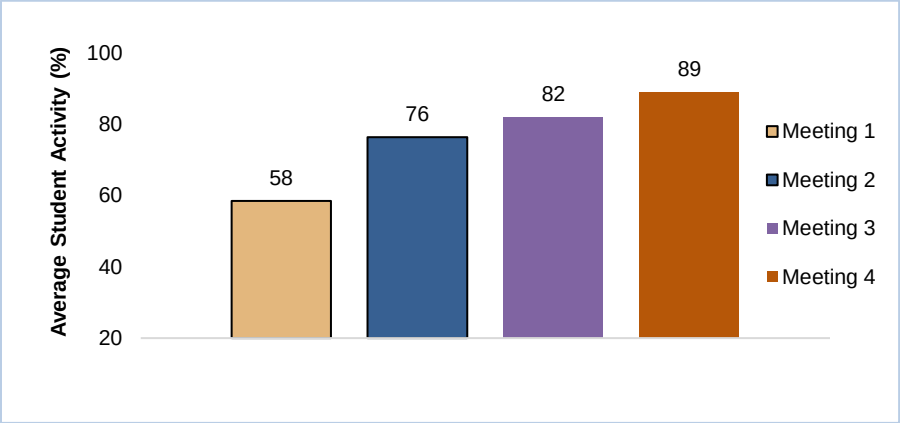

Figure 1. Graph of Average Student Learning Activities of Experimental Classes

The average student learning activity in Figure 1 shows that there is an increase in each meeting in 4 meetings. During the learning process, students were able to follow and develop the AKS strategy in learning biology of virus material with the help of *Google Classroom*. The observation results showed quite good results since the first meeting, namely 58% with good criteria, which means that students are so enthusiastic and can follow the learning of virus biology using the AKS strategy. Furthermore, at the second meeting, the observation results of student learning activities increased to 76% which was also included in the good criteria. At the third meeting, the observation results also increased from the previous one, which was 82%, and at the fourth meeting the highest result was 89%. These results show that students are increasingly motivated in learning by using the AKS strategy assisted by *Google Classroom*.

b. Differences in the Improvement of Student Learning Outcomes of Experimental and Control Classes

1) Improvement in Student Learning Outcomes between Experimental and Control Classes

The increase in student learning outcomes between experimental and control classes was obtained from a multiple choice question test consisting of 30 questions. The purpose of this test is to determine the difference in the improvement of student learning outcomes in the experimental class, namely the class that was treated with the application of *Google Classroom-assisted learning* strategies and the control class, namely the class that was not treated with the application of *Google Classroom-assisted learning* strategies on virus material, but used a conventional learning model as the learning model suggested / commonly used by biology teachers at SMA Negeri 1 Tanjung Brebes in learning biology virus material. Tests were given to experimental and control classes before learning (*pretest*) and after learning (*posttest*). The average results of the *pretest-posttest of the* experimental class and control class can be seen in the figure below.

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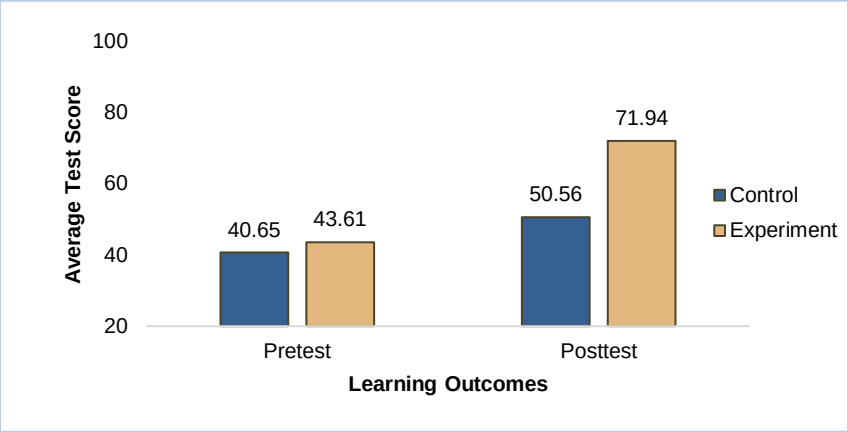

Figure 2. Graph of Average Value of Pretest and Posttest Learning Outcomes Experimental Class and Control Class

Based on Figure 2, it shows the average *pretest-posttest* scores of the experimental and control classes with an increase difference between the two. The average pretest of the experimental class was 43.61 while the average pretest value of the control class was 40.65. The difference in the average value of the pretest results between the experimental class and the control class is 2.96. The difference results show a relatively small number which indicates that the control class and the experimental class have initial abilities that are not much different on the topic of virus biology material.

It was found that the average *posttest* value in the experimental class was greater than the control class. The average value of the experimental class *posttest was* 71.94 while the average value of the control class *posttest was* 50.56. These results show that there is an increase in experimental and control classes from pretest to posttest, meaning that there is an increase in student learning outcomes in both experimental and control classes. The difference in *posttest* results between the experimental and control classes increased to 21.38. The difference in the *posttest* shows the results of different final abilities after learning with 2 different treatments. Meanwhile, to find out the extent of the improvement that occurred in the *pretest* and *posttest results* between the experimental and control classes, it is necessary to calculate the Gain Value (*N-gain*). The *N-gain* calculation is carried out to determine whether there is an increase in learning outcomes in the experimental and control classes.

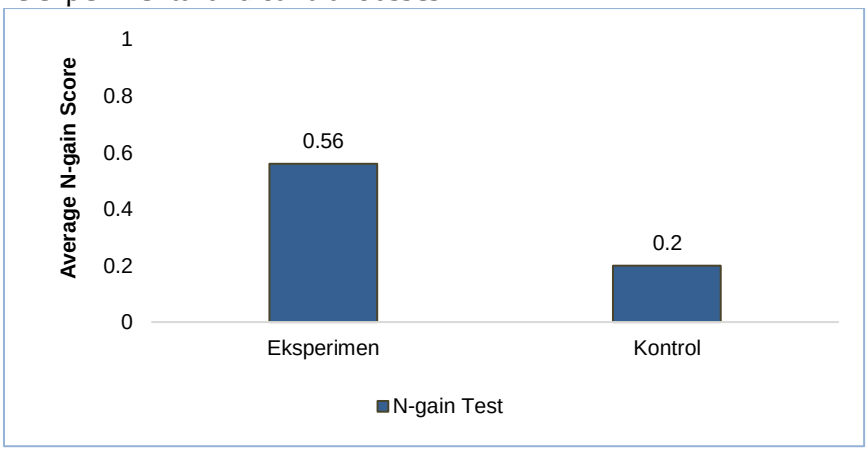

Figure 3. Graph of Average *N-gain of* Student Learning Outcomes

Based on the results of the calculation of the *pretest-posttest N-gain* value of student learning outcomes, the average *N-gain value* in the experimental class was 0.56 with moderate criteria, while

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the control class obtained an average *N-gain* value of 0.20 with low criteria. These results show that the increase in learning outcomes in the experimental class is greater than the control class. Meanwhile, to see whether there is a significant difference in improvement between the *N-gain of the* experimental class and the control class, it is necessary to conduct a further test, namely the T-test (*Independent Sample T-test*). In addition, the increase in student learning outcomes in the application of *Google Classroom-assisted* learning strategies can also be seen from the average results on the *pretest* and *posttest of* each cognitive level based on *Bloom's Taxonomy*.

2) Analysis of Differences in Learning Outcomes of Experimental and Control Classes

The difference in improving student learning outcomes with the application of the *Active Knowledge Sharing* strategy assisted by *Google Classroom* can be seen by conducting statistical tests. Statistical tests are used to test a hypothesis that has been formulated. Hypothesis testing was carried out on the N-gain values of the experimental and control classes as a whole and also at each cognitive level in *Bloom's taxonomy* used in this study. However, previously a pre-requisite test was carried out as a condition in the selection of statistical tests that could be carried out next.

The pre-requisite test is divided into two stages, namely normality test and homogeneity test. The pre-requisite test was carried out using *SPSS version 29.0 software*. The results of the normality and homogeneity tests of the experimental and control classes can be seen as follows.

Table 6. Prerequisite Test of Experimental and Control Classes

Class	Test Data	Normality Test (*Kolmogorov-Smirnov*)		Homogeneity Test (*Levene-Test*)	
		Sig	Ket.	Sig	Ket
Experiment	N-Gain	0,200	Normal	0,227	Homogeneous
Control	N-Gain	0,200	Normal		

Table 6 shows the results of the *pre-requisite* test through the calculation of the average *N-Gain* value of the experimental class and control class with the *Kolmogorov-Smirnov test*. The results of the *Kolmogorov-Smirnov* normality test calculation obtained a significance value ≥ 0.05, namely 0.200, meaning that the data is normally distributed. Likewise, the control class, obtained a significance value greater than 0.05 in the calculation of the *Kolmogorov-Smirnov normality* test, which is 0.200, which means that the data is normally distributed.

After the normality test is carried out, the second prerequisite test is the homogeneity test to determine whether the two samples have similar variances or not. Table 2 shows the results of the homogeneity test of the *N-Gain* scores of the experimental and control classes. The homogeneity test result ≥ 0.05 is 0.227 which means the data is homogeneously distributed.

The results of the pre-requisite test become a benchmark to determine whether there is a significant difference in the increase in student learning outcomes between the experimental class and the control class, so then a statistical test/different test can be carried out with a *parametric test,* namely the 2-sample *T-test* (*independent T-test)* through the SPSS version 29.0 *software. The* following table shows the results of the *independent T-test* test of the overall *N-gain* value.

Table 7. General Hypothesis Test of Experimental and Control Classes

Test Data	Difference Test	Sig. (2-tailed)	Description
N-gain	*Independent T-test*	0,000	Significantly Different

Based on the results of hypothesis testing conducted with the *Independent T-test test* in Table 7, it can be seen that the data shows that there is a significant difference between the *N-gain values*

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of the experimental class and the control class with a significance value of 0.000 <0.005, which means that H_o is rejected and H_a is accepted. Based on this, it can be concluded that there is a difference in the improvement of student learning outcomes between classes that use the *Active Knowledge Sharing* strategy assisted by *Google Classroom* and classes that do not use the *Active Knowledge Sharing* learning strategy at SMA Negeri 1 Tanjung Brebes in learning biology virus material. Meanwhile, the results obtained in the hypothesis test which show that there are differences in the improvement of student learning outcomes can be interpreted that there are differences in the *posttest results in the* experimental and control classes, where the results obtained in the experimental class are superior compared to the control class.

3) Student Response to Learning with the Application of *Active Knowledge Sharing* Assisted by *Google Classroom*

Student response in the learning process is an important thing to note in supporting the next student learning process. In order to find out student responses during teaching and learning activities, an instrument in the form of a student response questionnaire is used which is given to students in the experimental class, namely the class that is given the treatment of applying learning with the *Active Knowledge Sharing* strategy assisted by *Google Classroom.*

The student response questionnaire for learning biology virus material with the application of the *Active Knowledge Sharing* strategy assisted by *Google Classroom* has 20 questions consisting of 10 positive statements and 10 negative statements. Student response questionnaires are distributed after the learning is complete by distributing paper *offline*. The results of analyzing student response data show that most students have a good response to learning biology of virus material. by using the *Active Knowledge Sharing* strategy assisted by *Google Classroom*. The following are the results of the analysis of student response questionnaire scores, shown in Figure 4.

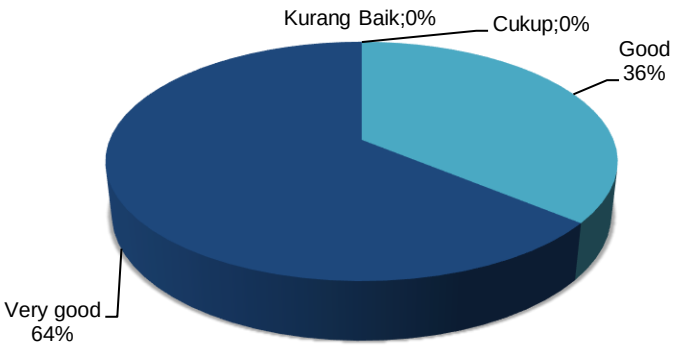

Figure 4. Percentage of Student Response Questionnaire to Learning ran with *Active Knowledge Sharing* Strategy Assisted by *Google Classroom*

Figure 4 shows that the overall student response is very good and good with a score in the very good category of 64% and good at 36%. The data shows that students feel happy and helped in understanding the biology of virus material by learning biology of virus material using the *Active Knowledge Sharing* strategy assisted by *Google Classroom*.

The student response questionnaire consists of 4 dimensions of the questionnaire with a total of 20 statements: (1) Student response to student learning motivation in biology learning with the use of *Active Knowledge Sharing* strategy assisted by *Google Classroom* (2) Student response to student activeness when learning with *Active Knowledge Sharing strategy* assisted by *Google Classroom* (3) Student response to the role and needs of *Active Knowledge Sharing* strategy in biology learning. And (4) Student response to the implications of the *Active Knowledge* Sharing

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strategy assisted by *Google Classroom* in learning biology. Student response questionnaires were given to 36 students in the experimental class after the learning process was completed. The results of the students' responses showed that the response to the application of the AKS learning strategy assisted by *Google Classroom* at SMA Negeri 1 Tanjung Brebes received a very good response to be one of the alternative learning models that can be used for more optimal biology learning.

2. Discussion

The application of the *Active Knowledge Sharing* learning strategy requires good knowledge sharing in the group. Students exchange knowledge with other students to solve problems proposed by the teacher and can connect what is obtained in everyday life. This is in accordance with the opinion of Zaini in Yolanda (2014), which states that knowledge sharing can involve individuals, groups and organizations. The purpose of knowledge sharing is to send information from a person to another person or organization, so that it can know the information that has been conveyed. This method is an integrated methodology to use knowledge effectively and efficiently through capturing, storing, sharing, learning, and exploring the knowledge gained to others.

Active learning strategy type *Active Knowledge Sharing* is one way to improve and build student activeness in the learning process. Fitria (2020) AKS is a method based on asking questions related to learning material to students and getting responses from students. In this learning method, students are ready to learn the subject matter quickly and can be used to see the level of students' ability in teamwork in solving a problem on the subject topic. The purpose of the AKS method is to make the lecture method developed by the teacher get students' attention, especially in classes with a large number of students.

Zaini in Yolanda (2014) states that the *Active Knowledge Sharing* strategy is a learning strategy that emphasizes student activeness in seeking and sharing knowledge through cooperation to help each other solve tasks or questions. With the process of exchanging knowledge, of course, students will be more motivated to learn the subject matter. In addition, it makes the memory of the subject matter last longer. The steps for implementing the AKS type active learning strategy are as follows:

1. The teacher provides a list of questions related to the subject matter to be taught.
2. The teacher instructs the students to answer the questions to the best of their ability.
3. Learners go around looking for friends who can help answer questions that they do not know or have doubts about. The teacher emphasizes to students to help each other.
4. The teacher organizes learners to return to their seats then check their answers. The teacher explains the question asked.
5. The answers that emerge are used as a bridge to introduce important topics from the subject matter.

The Active Knowledge Sharing strategy can be an effective tool to increase active student participation, increase student understanding, improve knowledge exchange skills, and encourage a spirit of cooperation between students. The AKS strategy is an active learning strategy that encourages students to actively share information and knowledge with their friends who are less able to solve the problems or problems given, both by the teacher and fellow students themselves. So positively this will support students to improve learning outcomes.

The application of the *Active Knowledge Sharing* learning strategy assisted by *Google Classroom* is a new experience for students, so that the application of biology learning with the AKS strategy stimulates student curiosity which has an impact on student activeness in the learning process. the learning process students are able to follow and develop the AKS strategy in learning biology virus material with the help of *Google Classroom*. Therefore, the application of the AKS strategy assisted by *Google Classroom* can create a learning atmosphere that not only understands,

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but provides experience so as to motivate students to be more active during the learning process which of course can affect student learning outcomes.

In the application of the *Active Knowledge Sharing* learning strategy, students not only discuss with members in their group but share knowledge with students between groups represented by a student. Students who move will discuss about solving problems or questions, at this time students will ask each other, answer questions, ask opinions and share knowledge that has been discussed in the group on the topic being discussed and compare the results of their group discussions with the results of the group discussions that he came to, so students will easily accept and understand the subject matter because they construct their own knowledge so that it is expected that the *Active Knowledge Sharing* learning strategy can improve student achievement.

Based on the results of data analysis, there are differences in improving student learning outcomes between experimental and control classes. Where the increase in student learning outcomes in the experimental class is greater than in the control class, this can be seen from the average *posttest score*, and also a different gain index, in the experimental class after learning with the implementation of the *Active Knowledge Sharing* strategy (knowledge exchange) with the help of the *Google Classroom* application, the average *posttest* score is 71.94, while for the control class the average *posttest score is* 50.19. In addition, the gain index for the experimental class obtained 0.56 which is classified into the category (high) while for the control class the average gain index value is 0.15 which is classified into the low category. This shows that the gain for the experimental class is higher when compared to the gain for the control class, in other words, the increase in student learning outcomes is higher than the control class. This is because the purpose of the *Active Knowledge Sharing* strategy is to send information from a person to another person or organization, so that it can know the information that has been conveyed better than the control class with lecture and discussion learning.

Learning using the *Active Knowledge Sharing* strategy with the help of the *Google Classroom* application is a new experience for students, because the *Active Knowledge Sharing* strategy with the help of the *Google Classroom* application has never been applied before in this class. The *Active Knowledge Sharing* strategy with the help of the *Google Classroom* application turned out to be able to improve student learning outcomes, this is in line with the opinion of Widayanti (2020) which this strategy also emphasizes students to share and help answer the questions given.

Based on the results of the prerequisite test, namely the normality and homogeneity test, the data obtained from the experimental class and control class are normally distributed and homogeneous, because the data from the two classes are normally distributed and homogeneous, then testing the hypothesis using the parametric test, namely the *T-Test (Independent T-Test)*. Based on the results of the *T-Test (Independent T-Test) test, the* Sig value was obtained. (2-tailed) 0.00 is smaller than the Sig value. (0,05). Because the value of Sig. (2-tailed) 0.00 <0.05, thus Ha is accepted and Ho is rejected, meaning that there is a difference in the improvement of student learning outcomes, between the experimental class and the control class on Virus material at SMAN 1 Tanjung Brebes.

After analyzing student learning outcomes, the process of analyzing student response questionnaires is continued. The student response questionnaire consists of 4 dimensions of the questionnaire with a total of 20 statements: (1) Student response to student learning motivation in biology learning with the use of *Active Knowledge Sharing* strategy assisted by *Google Classroom* (2) Student response to student activeness when learning with *Active Knowledge Sharing* strategy assisted by *Google Classroom* (3) Student response to the role and needs of *Active Knowledge Sharing* strategy in biology learning. And (4) Student response to the implications of the *Active Knowledge Sharing* strategy assisted by *Google Classroom* in learning Biology. Student response questionnaires were given to 36 students in the experimental class after the learning process was complete.

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Based on the analysis of the results of student responses through questionnaires that have been distributed to the experimental class, the overall student response is very good and good with a score in the very good category of 64% and good at 36%. The data shows that students feel happy and helped in understanding the biology lesson of virus material by learning biology of virus material using the *Active Knowledge Sharing* strategy assisted by *Google Classroom. Google classroom* performance is related to the appearance, workings and facilities provided for its use. *Google classroom* has features that have been provided, among others, can easily share and receive assignments in the form of files, provide quizzes and questions in the form of essays or multiple choice, and upload materials to be delivered in online classes. The effectiveness of google classroom performance is in the facilities provided such as teachers and students can use the features in google classroom, through google classroom in addition to using providing material from the teacher it is also effective to overcome in giving assessments to students. Mahitsa (2020) The advantages of this strategy can stimulate students to be more active, can train to get used to exchanging ideas in overcoming every problem, can train students to be able to express opinions or ideas, besides that, discussions can also train students to respect the opinions of others.

Based on the description above, it can be seen that there are differences in the achievement of learning outcomes in the two classes as a result of the different forms of treatment received by students. Where students who are treated with the application of the *Active Knowledge Sharing* Strategy (exchanging knowledge) with the help of the *Google Classroom* application compared to students who only use conventional learning. This is in line with the opinion Isnaniah (2021), that conventional learning or using lectures is economical and effective only for the purpose of conveying information and understanding. However, the weakness is that students will tend to be passive. the arrangement is carried out by the teacher and tends to place the teacher as the final authority. Thus, the learning outcomes of students who take part in learning by applying the *Active Knowledge Sharing* Strategy (exchanging knowledge) with the help of the *Google Classrooom* application are better than those of students who take part in conventional learning on the subject of viruses.

CONCLUSIONS

1. The application of the Active Knowledge Sharing strategy (exchanging knowledge) with the help of the Google Classroom application in each meeting of student activeness tends to increase, during the four meetings the average of each aspect assessed shows a good category, namely at the first meeting an average value of 58% with good criteria which means that students are so enthusiastic and can follow the learning of virus biology using the Active Knowledge Sharing strategy. Furthermore, at the second meeting, the observation results of student learning activities increased to 76% which was also included in the good criteria. At the third meeting, the observation results also increased from the previous 82%, and at the fourth meeting the highest result was 89%. These results show that students are increasingly motivated in learning by using the Active Knowledge Sharing strategy assisted by Google Classroom.
2. Biology learning outcomes on Virus material of experimental and control class students, seen from the average value of gain shows the average value of pretest per cognitive level on learning outcomes in Bloom's Taxonomy, it can be seen that the highest experimental class pretest value is at the C1 cognitive level, namely knowledge or ability to know with an average value of 48.15 and the lowest experimental class average value is at the C6 cognitive level, namely the ability to evaluate with an average result of 35.19. The same thing happened to the average value of the control class pretest at each cognitive level, the highest average value was obtained at the C1 cognitive level with an average value of 39.81 and the lowest average

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value was at the C6 cognitive level, namely the ability to evaluate with an average value of 34.26. The average results of the posttest of the experimental class and control class in Table 4.2 show an increase from the pretest results. The average result of the highest experimental class posttest was at the C1 cognitive level, namely the ability to know with an average value of 92.59 and the lowest experimental class average value was at the C6 cognitive level, namely the ability to evaluate with an average value of 52.78. The average results of the control class posttest showed the same thing, the highest average value was obtained at the C1 cognitive level with an average value of 62.04 and the lowest control class average value was at the C5 cognitive level, namely the ability to synthesize with an average value of 42.59. Based on the results of the average value of pretest and posttest cognitive levels of learning outcomes in Table 4.2, it can be seen that the average value of the posttest of the experimental class and control class has increased from the average value of the pretest. The calculation of the N-gain value at each cognitive level of student learning outcomes was carried out to determine the extent of the improvement in learning outcomes that occurred in the experimental and control classes.

3. Based on the results of the questionnaire responses of experimental class students about the application of the Active Knowledge Sharing Strategy (exchanging knowledge) with the help of the Google Classroom application, most students showed positive answers. This can be seen from the recapitulation of the average percentage of questionnaire answers from 36 students. With the application of the Active Knowledge Sharing strategy with the help of the Google Classroom application, it is effective in learning virus material which is indicated by the positive response of students.

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