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The Effect of Applying the Gagnon and Collay Learning Model in Biology Learning on Student Learning Outcomes at SMA Negeri 13 Bone

Suryani Suryani, Sri Wahyuni , Sitti Asmah

Program Studi Pendidikan Biologi, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Muhammadiyah Bone, Jl. Abu Dg. Pasolong, Bone, Sulawesi Selatan, Indonesia.

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ABSTRACT

Students have difficulty understanding biology learning material, for this reason students need to be directed to understand biology learning concepts. This research aims to determine the effect of applying the *Gagnon and Collay* learning model in biology learning on student learning outcomes at SMA Negeri 13 Bone. The research used is a quantitative method with a Pre-Experimental Design type. where this research uses one class, namely the experimental class, at the beginning of the learning a pretest (initial test) will be given and at the end of the learning a posttest (final test) will be given. The research results obtained by the author are that the use of the Gagnon and Collay learning model can influence student learning outcomes at SMA Negeri 13 Bone. The average student pre-test score was 41.8 and the average post-test score was 85.4. Where using the *Gagnon and Collay* learning model can help students become more active in the learning process, apart from that students can also develop their creative patterns because they must be able to show their learning results or work, as well as help students to collaborate with members of their respective groups. This research can be input for teachers as a model that can help students improve their learning outcomes.

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PENDAHULUAN

Education is a conscious and planned effort to create a conducive learning atmosphere so that students are actively able to develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals, and the skills they need. With education, it is hoped that it can create an intelligent and qualified generation of the nation so that it can make good use of emerging advances. A person's success in education certainly cannot be separated from a quality learning process and supporting infrastructure (Khalik, 2022). Teachers also play an important role in student success, where the way the teacher delivers learning material can influence the student's learning

Korespondensi Author: suryanisury11@gmail.com (Suryani)
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outcomes. Apart from that, student enthusiasm is also one of the factors that supports student success in participating in the learning process (Bayuaji, 2022). Wahyuni (2018) say learning is essentially a process of effort carried out by someone to achieve changes in behavior.

Apart from that, the cause of the lack of student learning outcomes in biology learning is due to the use of inappropriate learning strategies, because the learning process that occurs is still centered on the teacher, where the teacher is in control of the learning process (Ruslan, et al., 2023). Of course, in the learning process, a teacher must have several learning strategies, one of which is implementing a learning model. This learning model can help teachers in carrying out teaching process activities. The learning model is the main aspect that can help teachers in teaching, such as creating a curriculum, designing learning materials, and guiding the learning process in class (Mirdad, 2020). Learning models can also be interpreted as teachers' patterns of being able to determine appropriate and efficient learning models to achieve educational goals (Rokhimawan et al., 2022).

Based on observations made on students at SMA Negeri 13 Bone, the author found several problems, including students' biology learning outcomes which were less than optimal because the learning process that occurred was still centered on the teacher, the teacher was in control of the learning process. In this condition, the learning process does not involve students in the learning process, causing some students to be less enthusiastic in participating in the learning process so that the material presented by the teacher cannot be absorbed well by the students. Even so, there are still some teachers who focus on student development, but this is still not enough to improve student learning outcomes.

The use of appropriate learning models and strategies can increase students' enthusiasm for learning to actively participate in the learning process, so this research uses the Gagnon and Collay learning model. It is believed that the Gagnon and Collay learning model can help improve student performance in following the learning process as well as student learning outcomes (Mardiyanti, et al. (2022; Sanuri, 2022). Sanuri (2022), using the Gagnon and Collay learning model can increase student activity The Gagnon and Collay model is a model that formulates learning design related to improving the quality of a person's performance in learning process activities so that there is an increase in better behavior than before so that students can demonstrate their learning results (Susanti, 2022). This learning model directs students to be active in the learning process, namely having discussions with classmates so that new knowledge will arise (Rahayu, et al., 2016).

The Gagnon and Collay model is a constructivist model that presents six stages in the learning process, namely situation, grouping, hooks, questions, exhibition and reflection (Indahsari, 2019). The Gagnon and collay model has advantages that can help teachers in carrying out learning process activities, including being able to help students to be more active in the learning process, being able to develop students' creative powers and being able to train cooperation between classmates. Therefore, the author is interested in conducting research entitled "The Effect of Applying the Gagnon and Collay Learning Model in Biology Learning on Student Learning Outcomes at SMA Negeri 13 Bone". The aim of this research is to determine the effect of applying the Gagnon and Collay learning model in biology learning on student learning outcomes. It is hoped that this research will be able to provide knowledge of biology learning related to the use of the

Gagnon and Collay learning model. Apart from that, this research can be input for teachers as a model that can help students improve their learning outcomes.

METHOD

Types of research

The research that has been carried out is of the Pre Experimental Desigen type, where this research uses one class, namely the experimental class, at the beginning of the learning a pretest will be given and at the end of the learning a posttest will be given.

Research design

Research design is a design used in research so that the research design carried out runs systematically. The research design used in this research is One Group Pre-test Post-test, where this design is a research design that uses only one class. At the beginning of the meeting, a pre-test is first given to see students' basic knowledge regarding the material that will be presented. Then after being given treatment at the end of the meeting, a post-test was given.

Table 1. Research design

Class	*Pre-test*	Treatment	*Post-test*
Experiment	**O_1**	**X**	**O_2**

Information:
O1: Pre-test score before being given treatment
X : Treatment (treatment) of the Gagnon and Collay learning model
O2: Post-test score after being given treatment with the Gagnon and Collay learning model

Research Location and Time

This research was carried out in class X MIPA SMA Negeri 13 Bone Jl. Hos Cokroaminoto Macanang Tanete West Riattang Bone Regency, South Sulawesi. This research was conducted in May, even semester of the 2022/2023 academic year.

Research Instrument

There are two research instruments used, namely learning outcomes tests and documentation. The tests used aim to see and measure the level of success of students in the learning process using the Gagnon and Collay learning model with multiple choice questions, which consist of 20 questions. The next instrument is documentation, where this documentation is information used by researchers in the form of archives, books, documents, writings, and pictures of student learning results in the classroom.

Research Population and Sample

The population in this study is all students of class X SMA Negeri 13 Bone, totaling 257 and the sample to be taken is class sampling is purposive sampling.

Data collection technique

The data collection techniques used in this research are learning outcomes tests and documentation.

Data analysis technique

There are two data analysis techniques used, descriptive statistical analysis and inferential statistical analysis. Descriptive statistical analysis uses learning outcome data based on scoring of learning outcomes which can be seen in the following table:

Table 2. Learning Outcome Scoring Criteria

No	Score	Categori
1	85-100	Very high
2	65-84	High
3	55-64	Currently
4	35-54	Low
5	0-34	Very low

Source : (Zahrawati, 2020)

The inferential statistical analysis uses three analysis techniques, namely normality test, homogeneity test, and hypothesis test. Normality test testing criteria if the probability value is greater than the significance level of 5% or 0.05 (P_{value}>0.05) then H_1 is accepted and H_0 is rejected, normality test testing criteria if the probability value is greater than the significance level of 5% or 0.05 (P_{value}>0.05) then H_1 is accepted and H_0 is rejected, while the hypothesis testing criteria is if the sig (2-tailed) value <0.05 then H_1 is accepted and H_0 is rejected.

RESULTS AND DISCUSSION

Description of Research Results

This research is experimental research carried out at SMA Negeri 13 Bone. In this research what will be seen are student learning outcomes using the Gagnon and Collay learning model. This research used one class, namely class X MIPA 5 with a total of 36 students who acted as an experimental class. This research was conducted in 3 meetings. Data on student biology learning outcomes obtained were obtained from learning outcomes test instruments using pre-test and post-test.

Descriptive Analysis

Descriptive statistical analysis is one way of collecting data to systematically describe research problems. The results of this research can be seen in the table below:

Table 3. Displays the pre-test descriptive statistical data for Class X MIPA 5 students

Descriptive statistics	Statistic value
Subject	36
Value range	30
Mean	41,8
Median	40,0
Mode	55
Minimum value	25
Maximal value	55
Standard Deviation	9,5

Source: *SPSS* Versi 22

Based on the descriptive statistical data in Table 3 above, which was obtained before implementing the Gagnon and Collay learning model, the average pre-test score was 41.8. The median score was 40.0, with a maximum score of 55 and a minimum score of 25, resulting in a score range of 30. The pre-test results showed a mode of 30, with 55 being the most frequently occurring value. The standard deviation (or standard deviation) in the pre-

test was 9.5, indicating that the standard deviation in the pre-test was smaller than the average value, making it a representative measure for the entire dataset. To explore the frequency distribution and percentage of pretest results further, refer to Table 4.

Table 4. Frequency distribution and percentage of students' pre-test learning outcomes

No	Score	Frecuency	Percentage	Category
1	85-100	0	0	Very high
2	65-84	0	0	High
3	55-64	8	22,2%	Moderate
4	35-54	21	58,3%	Low
5	0-34	7	19,5%	Very low
Number		**36**	**100%**	

Based on Table 4 above, it is shown that out of the 36 students who were experimented with before receiving treatment using the Gagnon and Collay learning model on environmental change and its impacts, 8 (22.2%) students fell into the medium category, 21 (58.3%) students were in the low category, and 7 (19.5%) students were in the very low category. There were no students in the high and very high categories. Based on the results of the descriptive analysis conducted in the X MIPA 5 experimental class at SMA Negeri 13 Bone, it is still necessary to carry out further research to achieve maximum results.

Furthermore, Table 5 presents the post-test descriptive statistical data.

Table 5. Post-test Descriptive Statistical Data for Class X MIPA 5 Students

Descriptive statistic	Statistic value
Subject	36
Value Range	20
Mean	85,4
Median	85,0
Mode	85
Minimal value	75
Maximal value	95
Standard Deviation	6,8

Source: SPSS versi 22

The results of the descriptive statistical analysis in Table 5 show that the average value of students' learning outcomes, who were taught using the Gagnon and Collay learning model after receiving treatment, increased from an average pretest value of 41.8 to 85.4, reflecting a difference of 43.6. Meanwhile, the maximum score on the pretest and post-test ranges from 55 to 95, with a difference of 40. The minimum score for the pretest and post-test ranges from 25 to 75, with a difference of 50. The categorization of student learning outcomes after treatment with the Gagnon and Collay learning model is presented in Table 6.

Table 6. Frequency distribution and percentage of students' post-test learning outcomes

No	Score	Frequency	Percentage	Kategori
1	85-100	24	66,6%	Sangat tinggi
2	65-84	12	33,4%	Tinggi
3	55-64	0	0	Sedang
4	35-54	0	0	Rendah
5	0-34	0	0	Sangat Rendah
Jumlah		**36**	**100%**	

Based on Table 6, the distribution and frequency of students' post-test results using the Gagnon and Collay learning model showed that there were 24 students with a percentage of 66.6% in the very high category and 12 students with a percentage of 34.4% in the high category. , and there are no students in the medium, low, and very low categories. Based on the results of the descriptive analysis that has been carried out, it can be concluded that the post-test results of class X MIPA 5 students are in the very high category which can be seen in the student post-test average of 85.4.

Inferential Analysis

Based on the results of data analysis carried out using the one sample Kolmogrov-Smirnov normality test, it shows that the sig. (2-tailed) taught using the Gagnon and Collay learning model shows 0.080 > 0.05 so it can be said that the data is normally distributed.

The homogeneity test was carried out to determine whether it came from a homogeneous population or not. The normality test using Levene Statistics showed that the significant value taught using the Gagnon and Collay learning model showed 0.060 > 0.05 so it could be said that the research population was homogeneous.

The t-test was carried out to test a hypothesis after fulfilling the normality and homogeneity test requirements to see the effect of applying the Gagnon and Collay learning model. The t-test used in this research is paired-test. The significance rate used is α = 0.05. The results of the data analysis obtained show that sig (0.000) < = 0.05, so it can be concluded that the research hypothesis is accepted.

DISCUSSION

This research is a type of pre-experimental research, namely a type of research using one class. In this type of research, there is no control class to compare with the experimental class, where the research sample used is given a pre-test and post-test. This research aims to see whether there is an influence of applying the Gagnon and Collay learning model in biology learning on student learning outcomes in class X MIPA 5 SMA Negeri 13 Bone.

This research went through several stages, the first stage began by giving a pre-test to students. This pre-test was carried out to see students' abilities before being treated with the Gagnon and Collay learning model. Based on data from table 4, the average pre-test score for class X MIPA 5 students is 41.8, which is in the low category. After being given treatment using the Gagnon and Collay learning model, the average value of student learning outcomes was 85.4, which is in the very high category, which can be seen in Table 6.

The pre-test scores obtained by students cannot be said to be optimal. This happens because the students in the class pay less attention to the teacher when explaining the

lesson. Apart from that, the condition of the classroom is not conducive because it is located between two classes, where when a class is empty the voices of students from that class can be heard clearly in the classroom. As a result, when the learning process takes place, students do not listen to the material presented by the teacher. Learning objectives can be achieved if a teacher has the skills to manage the class well to create a conducive learning atmosphere (Gafur & Mustafida, 2019).

A conducive learning atmosphere can be seen if changes have occurred in students. These changes include changes in attitudes, behavior, and cognition. However, this is inversely proportional to the conditions faced by students today. Currently, students tend to be passive in participating in class learning and do not listen to the teacher's presentation of material. Students' attitudes generally still lack positive and active responses in the learning process, where students have not adapted to the learning model applied (Sanuri, 2022).

Research using the Gagnon and Collay learning model is a learning model solution that can help students in the learning process (Mardiyanti, 2022). Applying the Gagnon and Collay learning model that has been implemented, students' post-test results have increased and are in the very high category with an average score of 85.4. The application of the Gagnon and Collay learning model can help students to improve student learning outcomes, this can be seen in research (Sanuri, 2022); (Susanti, 2022); (Mardiyanti, et al., 2022). This learning model has advantages that can help students in the learning process, including being able to help students become more active and able to develop their creativity. Apart from helping students become more active and develop creativity, this model also trains students to work together with their group members (Sanuri, 2022).

The Normality Test was analyzed using SPSS version 22 on the One Sample Kolmogrove-Smirnov results showing that the sig (2-tailed) value taught using the Gagnon and Collay learning model showed pre-test value data of 0.080 > 0.05 and post-test value data amounting to 0.063 > 0.05 so it can be said that the pre-test and post-test value data are normally distributed. After carrying out the normality test, a homogeneity test is then carried out to determine whether the data from the population is homogeneous or not. The homogeneity test was carried out using the Levene Statistics test and obtained results of 0.60 > 0.05 so it can be said that the research population is homogeneous.

After carrying out normality and homogeneity tests, hypothesis testing is then carried out. The t-test was carried out to see whether there was an influence using the Gagnon and Collay learning model on student learning outcomes. The t-test used in this research is the paired t-test with a significance level of $\alpha = 0.05$. The results obtained show that sig (0.000) $< \alpha = 0.05$, so it can be concluded that the research hypothesis is accepted.

Based on the discussion above, it can be concluded that the preparation of the Gagnon and Collay learning model has a significant and positive influence on the biology learning outcomes of class X MIPA 5 students at SMA Negeri 13 Bone.

CONCLUSION

Based on the research results, it was found that the average pre-test score of students before being given treatment was 41.8 in the low category. The average post-test score of students after being given treatment was 85.4 in the very high category. So it can be concluded that the application of the Gagnon and Collay learning model influences the biology learning outcomes of class X

students at SMA Negeri 13 Bone or it can be said that the research hypothesis is accepted.

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