



Research Article

## The Effect of Student Learning Outcomes Using A Tutorial Model With A Group Investigation (GI) Type Cooperative Model On The Ecosystem Concept In State High School

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**Abstract.** Success in the learning system is determined by several factors including teachers, students, learning models, media, and learning facilities. One of the learning models that is considered appropriate and can create new learning conditions is the tutorial model and the cooperative group investigation (GI) model. In general, this study aims to determine the influence of the two models above on student learning outcomes on the concept of ecosystem. Respondents in this study were students of grades X 5 and 6, which were determined randomly. The type of research used is with a quantitative approach, the method used is an experimental approach. The instrument used as a data collection tool in the form of learning outcomes tests as many as 25 questions out of

30 questions after being tested for validity through validity, reliability, difficulty index, and differentiating power. The test was conducted twice with pre-test and post-test in experimental class 1 and experimental class 2. Based on the results of the study showed that; 1) there is an influence of the tutorial learning model on the ecosystem concept of student learning outcomes, 2) there is an influence of the group investigation (GI) cooperative learning model on the ecosystem concept of student learning outcomes, 3) there are differences in learning activities through the tutorial model and cooperative group investigation (GI). Overall, the tutorial learning model is better and more effective for overcoming student learning activity problems on the ecosystem concept than the group investigation (GI) cooperative learning model.

**Keywords:** Learning Model, Tutorial, Cooperative, Group Investigation, Learning Outcomes.

**Abstrak.** Keberhasilan dalam sistem pembelajaran ditentukan oleh beberapa faktor diantaranya: guru, siswa, model pembelajaran, media dan sarana pembelajaran. Salah satu model pembelajaran yang di pandang sesuai dan dapat menciptakan kondisi pembelajaran baru diantaranya model tutorial dan model kooperatif group investigation (GI). Secara umum penelitian ini bertujuan untuk mengetahui pengaruh kedua model di atas terhadap hasil belajar siswa pada konsep ekosistem. Responden dalam penelitian ini adalah siswa-siswi kelas X 5 dan 6, yang ditentukan secara random. Jenis riset yang dipakai yaitu dengan pendekatan kuantitatif, Metode yang dipakai adalah pendekatan eksperimen. Instrumen yang digunakan sebagai alat pengumpul data bentuk test hasil belajar sebanyak 25 soal dari 30 soal setelah diuji kesahihannya melalui validitas, reliabilitas, indeks kesukaran dan daya pembeda. Test dilakukan sebanyak dua kali dengan pre-test dan post-test pada kelas eksperimen 1 dan kelas eksperimen 2. Berdasarkan hasil penelitian menunjukkan bahwa; 1) terdapat pengaruh model pembelajaran tutorial pada konsep ekosistem terhadap hasil belajar siswa, 2) terdapat pengaruh model pembelajaran kooperatif group investigation (GI) pada konsep ekosistem terhadap hasil belajar siswa, 3) terdapat perbedaan aktivitas belajar melalui model tutorial dan kooperatif group investigation (GI). Secara keseluruhan, model pembelajaran tutorial lebih baik dan efektif untuk mengatasi masalah aktivitas belajar siswa pada konsep ekosistem dari pada model pembelajaran kooperatif group investigation (GI).

**Kata Kunci:** Model Pembelajaran, Tutorial, Kooperatif, Group Investigation, Hasil Belajar.

## INTRODUCTION

School is one of the formal institutions that provide education. The implementation of education in schools, among others, is aimed at the teaching and learning process to achieve goals in the form of learning outcomes by abilities. The process of delivering lessons will be more appropriate if with the term instilling knowledge that "teaching is imparting knowledge or skills as developed (Schulze, 2023).

In the activities of the educational process in schools, teaching and learning activities are the most basic things. Because the success or failure of educational achievement depends on the learning process of students who act as students and teachers who manage the class. Success in the teaching and learning process is greatly influenced by how a teacher delivers the subject matter, being a facilitator

and motivator who can provide an easy learning experience for students (Rihatno & Nuraini, 2023).

Success in the teaching and learning system is determined by several factors including teachers, students, learning models and methods, media, facilities, and so on. To be able to carry out duties in their profession, teachers must have certain competencies (Merdekawati, 2022). One of the abilities that must be possessed is to choose a learning model that matches the objectives, characteristics of students, and available facilities (Onan, 2023).

To make biology learning interesting, a learning model is needed that is expected to provide a new atmosphere in the classroom (Nurjaman et al., 2023; Nurjaman & Saparlina, 2023b, 2023a). In the observations of researchers, when entering class X of SMA Negeri 4 Garut on biological materials, especially pollution material problems in the learning process, including; The model that has been carried out by conventional teachers makes learning very boring and boring, the value of biology subjects, especially pollution material which is felt to still need to be improved, and teachers use less supporting media other than books.

One of the learning models that is considered appropriate and can create new learning conditions is a learning model that emphasizes more independence and participation or cooperation (Saengduenchay & Noenthaisong, 2023). This learning model is very different from other learning models, besides being developed to achieve academic learning outcomes, it is also effective for developing student creativity. This learning model is seen to create an interesting and not monotonous learning atmosphere, one of which is by using a tutorial model because this model is considered more optimal (Karmakar et al., 2023). Tutorials are tutoring in the form of providing direction, help, guidance, and motivation so that students learn optimally and get better results (Trujillo, 2009).

The cooperative group investigation (GI) model is a form of cooperative learning model that emphasizes student participation and activity to find the material (information) to be learned. The Group Investigation (GI) model can train students to cultivate independent thinking skills. Active student involvement can be seen from the first stage to the final stage of learning (Pramartha et al., 2023).

From the above problems, the author is interested in examining student learning outcomes using the tutorial model and the group investigation (GI) cooperative model, so this thesis is entitled "The Effect of Student Learning Outcomes Using the Tutorial Model with the Group Investigation (GI) Cooperative Model on the Ecosystem Sub-Concept at SMAN 4 Garut".

Based on the background above, the formulation of the problem of this study is as follows: How the influence of student learning outcomes using the tutorial model with the Group Investigation (GI) cooperative model on the concept of Ecosystem at SMAN 4 Garut.

## METHODS

This type of research is experimental and comparative research using Completely Randomized Design. Completely Randomized Design is a comparative experimental design without the use of control classes (Rahimi et al., 2023). That is, both classes are experimental. Using pre and post-observation to obtain research data. This research was conducted at SMAN 4 Garut class X semester II. The population in this study was all students from 8 classes randomly totaling 68 people.

## RESULTS AND DISCUSSION

### Result

#### 1. Description of research data

The authors conducted this study using two learning models; one group uses the tutorial model, and the other uses the Cooperative Group (GI) Investigation model. The purpose of this study was to compare the impact of each group's learning outcomes. Although the success of the learning process has many influencing factors, the learning model is one of the factors that greatly affects student success which is directly related to teachers and students (Soeprijanto et al., 2023).

Using a learning outcomes test consisting of 25 questions, data on students' mastery of the concept of ecosystem concepts were collected. The first test was given to measure the students' initial ability and the second test was given to compare the two models that the authors reviewed. This is by the definition of the test itself, "a test is an experiment held to determine the presence or absence of certain learning outcomes in a student or group of students" (Hazan et al., 2023). Based on the results of the study, the overall student learning outcomes were obtained as follows.

**Table 1.** Descriptive Statistical Results

No.	Descriptive Size	N	Minimum	Maximum	Mean	Std. Deviation
1	Pre-Experiment1	33	32	72	46,54	9,31
2	Post-Experiment1	33	64	92	78,06	6,86
3	Pre-Experiment2	35	28	56	45,37	7,81
4	Post-Experiment2	35	60	92	73,71	8,07
5	Valid N (listwise)	33				

Source: Primary Data Processing 2023

Table 1 shows that the learning outcomes scores of grade X 5 and 6 students from 33 respondents at SMAN 4 Garut before Experiment 1 with the Tutorial Model averaged (46.54%) medium category; after Experiment 1, the average increased to 78.06% in the high category. Compared to the Group Investigation (GI) Type Cooperative Model of 35 respondents before Experiment 2 the average (45.37%) was medium category; and after Experiment 2, the average increased to 77.06% high category.

a) Description of Observation Data in the Experimental Class 1

Observations were made before and after being treated with the Tutorial learning model. The following is a table of observations of Learning Outcomes in class experiment 1 with a Tutorial Model:

**Table 2.** Frequency Distribution of Learning Outcomes in Experimental Classes 1

<b>Data</b>	<b>Smallest score</b>	<b>Biggest score</b>	<b>Average</b>	<b>Criterion</b>
<i>Pre</i>	32	72	46,54 %	Less Active
<i>Post</i>	64	92	78,06 %	Active

*Source: Primary Data Processing 2023*

Table 2 shows that the pre-test score of grade X 5 and 6 students at SMAN 4 Garut before the use of the Tutorial Model was 72 (46.54%) less active criteria, but after the use of the Tutorial Model, the score increased to 92 (78.06%) active criteria. Learning outcomes in experimental class 1 increased significantly by 31.52% from less active to active in learning ecosystem concepts.

b) Description of Observation Data in the Experimental Class 2

Observations in experimental class 2 before and after being treated with the Group Investigation (GI) Type Cooperative learning model can be seen in the following table:

**Table 3.** Frequency Distribution of Learning Outcomes in Experimental Classes 2

<b>Data</b>	<b>Smallest score</b>	<b>Biggest score</b>	<b>Average</b>	<b>Criterion</b>
<i>Pre</i>	28	56	44,37 %	Less Active
<i>Post</i>	60	92	73,71 %	Active

*Source: Primary Data Processing 2023*

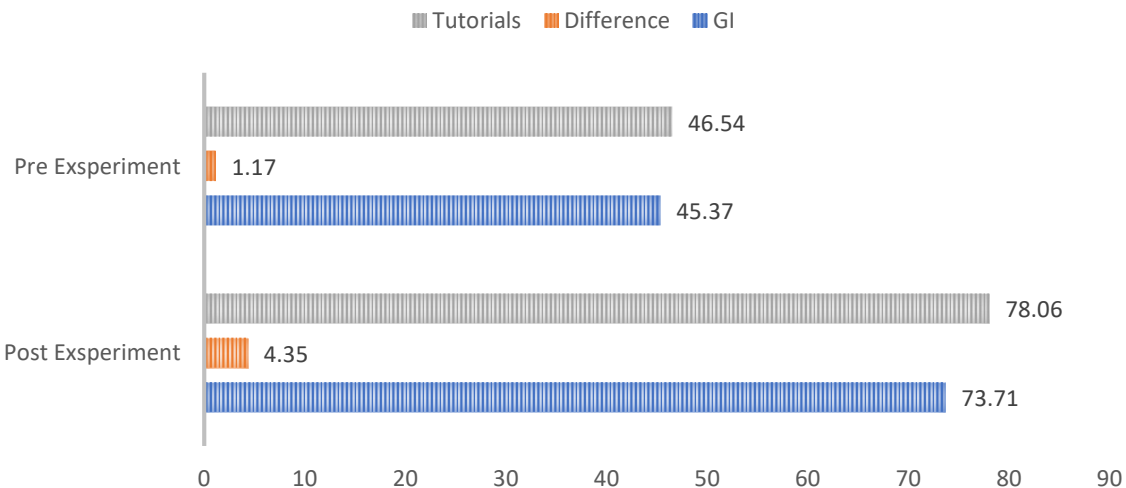
Table 3 shows that the pre-test score of grade X 5 and 6 students at SMAN 4 Garut before the implementation of the Type Cooperative Model (GI) was 56 (44.37%) less active criteria, but after the implementation of GI, the score increased to 92 (73.71%).

Learning outcomes in experimental class 1 increased significantly by 29.34% from less active to active in learning ecosystem concepts.

c) Comparison of Observational Data Descriptions in Experimental Class 1 and 2

Comparison of pre and post-observation data in experimental class 1 and experimental class 2 can be illustrated as follows:

**Figure 1.** Comparison of Learning Outcomes in Experimental Class 1 and 2



Source: Primary Data Processing 2023

Figure 1 shows a significant difference after treatment between the tutorial learning model and the Cooperative Group (GI) Investigation Model on ecosystem concepts. The learning outcomes of grade X 5 and 6 students at SMAN 4 Garut are strongly influenced by the tutorial learning model, which reaches 78.06 percent of the active criteria. The difference between the two (4.35%) is quite significant.

**2. Classical Assumption Test**

a) Data Normality Test

**Table 4.** Normality Test Results

Variable	Class	Shapiro-Wilk		P-value
		Statistic	df	
Learning Outcomes of Ecosystem Concepts	Pre- Experiment 1	0.948	33	0.114
	Post- Experiment 1	0.959	33	0.240
Learning Outcomes of Ecosystem Concepts	Pre- Experiment 2	0.937	35	0.044
	Post- Experiment 2	0.966	35	0.345

Source: Primary Data Processing 2023

Table 4 shows tutorial learning models and cooperative group (GI) type investigations of ecosystem concepts. According to the results, a significance value or p-value of more than 0.05 indicates that the data is homogeneous and can be used for hypothesis testing. However, one data is not homogeneous, namely the pre-experiment data 2 Cooperative Model Type Group Investigation (GI), whose result is 0.044 less than 0.05, which shows that the data is abnormal and cannot be used for hypothesis testing.

b) Data homogeneity test

**Table 5.** Homogeneity Test Results

Variants		Levene Statistic	df1	df2	P-value
Learning Outcomes of Ecosystem Concepts	Based on Mean	0.921	1	66	0.341
	Based on Median	0.624	1	66	0.433
	Based on the Median and with adjusted df	0.624	1	65.074	0.433
	Based on trimmed mean	0.893	1	66	0.348

Source: Primary Data Processing 2023

Post-test data of tutorial and cooperative learning models of group investigation (GI) type on ecosystem concepts are shown in Table 5. A significant value or p-value > 0.05 indicates that the data is homogeneous and can be continued with hypothesis testing.

c) Test the hypothesis

**Table 6.** Hypothesis Test Results

		Paired Differences				t	df	P-value
		Mean	SD	SE Mean	95% CI Lower Upper			
Pair 1	Pre-Test- Post-Test Tutorial	- 31.515 15	6.98266	1.21553	-33.99110 -29.03921	-25.927	32	0.000
Pair 2	Pre-Test- Post-GI Test	- 28.342 86	8.64306	1.46094	-31.31185 -25.37386	-19.400	34	0.000

Source: Primary Data Processing 2023

The hypothesis test using the paired sample t-test mentioned earlier can be summed up as follows, as shown in Table 6.

- 1) Experimental class 1 consisting of pre and post-observation has a p-value of 0.000. By the terms of hypothesis testing, H<sub>01</sub> is rejected and H<sub>a1</sub> is accepted if the alpha < 0.050. That is, student learning outcomes are influenced by the concept of ecosystem when the tutorial learning model is applied.
- 2) A p-value of 0.000 was found in experimental class 2, which included before and after observations. In terms of hypothesis testing, H<sub>02</sub> is also rejected and H<sub>a2</sub> is accepted if the alpha < 0.050. That is, student learning outcomes are influenced by the ecosystem concept when the investigation group (GI) type cooperative learning model is applied.

The following table shows the comparison results of the two learning models:

**Table 7.** Comparative Hypothesis Test Results

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	P-value	Mean Difference	SE Difference	95% CI Lower	95% CI Upper
Learning Outcomes of Ecosystem Concepts	Equal variances assumed	0.921	0.341	2.384	66	0.020	4.346	1.823	0.707	7.986
	Equal variances not assumed			2.396	65.32	0.019	4.346	1.814	0.724	7.969

Source: Primary Data Processing 2023

Based on Table 7, it is known that the value of learning activities in equal variances assumed obtained a p-value of 0.000 < 0.050, based on the provisions of hypothesis testing, H<sub>03</sub> is rejected and H<sub>a3</sub> is accepted. That is, there is a difference between the tutorial learning model and the Cooperative Group (GI) Investigation model of how ecosystems affect student learning outcomes.

## DISCUSSION

### 1. The effect of the implementation of the Tutorial learning model on the ecosystem concept on student learning outcomes

The results showed that the tutorial learning model on the concept of ecosystem affects student learning outcomes. This is because this model allows students to interact with teachers and students in multiple directions, preventing them from becoming passive in class (Puspandari & de Haviland Basoeki, 2020). Instead, the new curriculum improves students' cognitive, affective, and psychomotor with this learning model (Zhang et al., 2021).



Researchers found many things when applying the tutorial learning model. There are many advantages of tutorial models that are based on ecosystem concepts. Some of these are that they make lessons more interactive, encourage students to participate, increase their passion for learning, allow multiple people to exchange opinions and learn together, increase cohesiveness, and reduce differences between students.

However, drawbacks include being difficult to control all students, some students being jealous, and making noise or disturbing other students. Overall, the tutorial learning model that focuses on the concept of ecosystems is perfect for addressing student learning outcomes issues.

## **2. The effect of the implementation of the Group Investigation (GI) Type Cooperative learning model on the ecosystem concept on student learning outcomes**

The results showed that the group type (GI) cooperative learning model on the ecosystem concept affects student learning outcomes. This is because the GI model emphasizes critical and complex thinking skills (intellectuals, attitudes, learning styles, and so on) during the learning process (Musannadah et al., 2023). Therefore, this model has an impact on student learning activities directly.

When applying this learning model, researchers found many things. This model can change the atmosphere of the class from previously passive or rigid to active or interactive. It increases students' self-confidence, improves social relationships between students and their teachers, allows students to share ideas and learn together, enhances their critical thinking power, makes the learning process enjoyable, and eliminates status differences between students. However, there are also some drawbacks. This includes spending too much time without restrictions, causing noise or being able to disrupt other classes, and some students becoming dependent. In general, inquiry group (GI) type cooperative learning models based on ecosystem ideas are well suited to apply when students start learning passively or rigidly.

## **3. Comparison of student learning outcomes from two tutorial learning models and group type (GI) cooperative inquiry of the learning ecosystem**

The results showed that student learning outcomes about ecosystem concepts were influenced by tutorial learning models and Investigation Group (GI) Type Cooperative learning models. A comparison of data in experimental classes shows that the tutorial learning model dominates 1.17% (before) and the Investigation Group (GI) Type Cooperative learning model dominates 4.35% (after). The Group Investigation (GI) Type Cooperative learning model can improve student learning outcomes about ecosystem concepts by 28.34%, while the tutorial learning

model can increase student learning outcomes by 31.51%. Overall, the tutorial learning model improves student learning outcomes about ecosystem concepts.

## **CONCLUSION**

Based on the results and conclusions of experimental research, it can be concluded that:

1. Student learning outcomes about the concept of ecosystems are influenced by the tutorial learning model. This can be seen from the change in student learning outcomes from the "less active" or weak category to the "active" category.
2. Student learning outcomes about the ecosystem concept are influenced by the group type (GI) cooperative learning model. The impact of this learning model can be seen from student learning activities categorized as "active" from previously "less active".
3. The tutorial learning model and Cooperative Group (GI) Investigation of ecosystem ideas are used to compare learning activities.
4. The tutorial learning model tackles student learning outcomes issues better than the inquiry group (GI) type cooperative learning model on ecosystem concepts.

## **CONFLICT OF INTEREST**

No conflict of interest

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