INCREASING LEARNING INTEREST AND CRITICAL THINKING IN STUDENTS: THE IMPACT OF POGIL ON ECOSYSTEM LEARNING

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ABSTRACT

21st-century learning requires a more student-centered, suitable, and interactive approach that stimulates their interest in learning. In addition, one of the basic skills is critical thinking skills. Of course, students' interests and critical thinking skills are greatly influenced by the selection of learning models. The objectives of this study are: (1) to determine the critical thinking skills of students taught without the POGIL model; (2) to identify the critical thinking skills of pupils taught with the POGIL model; and (3) to determine the learning interests of learners taught without the POGIL model. (4) to determine students' learning interest in what is taught by the POGIL model; (5) to establish the impact of the POGIL model on the critical thinking skills of the pupils; and (6) to determine how the POGIL model affects the learning interest of students and pupils. This quantitative research has a quasi-experimental design using a non-equivalent control group design. The population of this study was class X MAN 2 Soppeng, which totaled 119 people, and the samples used in classes X1 and X2 totaled 38 pupils. The sampling technique used was purposive sampling. The instruments used were critical thinking skills tests, learning interests, and observation sheets. The analytical techniques were descriptive and inferential. According to the results, the control class students' critical thinking abilities scored 73.5, which is in the highest group, and 83.53, which is in the very high category. The POGIL model had a significant impact on critical thinking skills, as indicated by the independent sample t-test results of 0,000 < 0,05 for critical thinking. The result is different from learning interest, where the independent sample t-test results showed 0,115 > 0,05 meaning that the model had no significant effect on the learning interests of the students.

Keywords: POGIL Model, Critical Thinking Skills, Learning interest

1). INTRODUCTION

The demands of development also encourage the generation to compete and have 21st-century skills based on the needs of information technology to prepare the 21st-century generation that has life skills, namely the 4 C skills, which include critical thinking, communication, collaboration, and

creativity (Sartini and Rahmat, 2022). If education is founded solidly, it can be implemented efficiently and have a clear direction. A strong curriculum must be available for education to be of high quality. The curriculum is crucial to the execution and accomplishment of schooling (Afandi, Tulus, and Rachmi, 2018).

Learning based on the independent learning curriculum demands creativity from educators and students and provides the freedom to access knowledge through formal and non-formal education. The presence of this independent learning curriculum must meet the challenges of education in the digital age. This curriculum supports the development of critical thinking skills, problem-solving, creativity, innovation, and the ability to collaborate and communicate (Manalu et al., 2022).

One of the basic skills that is in focus in the 21st century is critical thinking. These skills include the ability to access, analyze, and synthesize information that can be learned, accustomed to, and managed. In addition, these critical thinking skills also explain other skills, such as communication skills, research, interpretation, analysis, and evaluation of evidence. Critical thinking and problem-solving abilities in students are highly valued across a range of subjects, particularly in the study of science (Artuz and Dennis, 2021). Improving critical thinking skills can be done with an appropriate learning model and through learning steps that have an active knowledge construction. The goal is for students to gain more meaningful knowledge. One component that influences critical thinking skills is interest in learning (Nugraha, Achmad, and Samnur, 2022). Interest in learning includes feelings of joy, attention, and seriousness in achieving goals. High interest in learning will make students more productive to learn (Damayanti, 2020).

Based on observations and interviews, the learning outcomes of class X students of MAN 2 Soppeng who could answer analysis and problem-solving questions were only 30%. Many of them still could not answer or express their ideas from questions related to the material given by educators during learning. In group activities, only a few students were active when submitting ideas or opinions on problem formulation and problem-solving. While most of the other students just sat and were silent because they did not know how to solve the problem, This observation is not much different from Faridah (2019), who found that many students could not reach the level of critical thinking because they faced difficulties in working on long questions and required analysis to understand the meaning of the question. It is determined that students in class X have poor critical thinking abilities based on this occurrence. Their lack of enthusiasm for studying biological material may have an impact

on this. The limited percentage of students who actively engage in learning activities, such as group projects and debates, serves as proof of this. It was also discovered in several student interviews that a high level of Latin decreased the students' interest in biology classes. Some students cannot learn independently, and they rarely repeat the material that has been taught in class. A similar thing was also expressed by Lestari and Melisa (2023): the low interest in learning biology was due to the delay of students when collecting assignments; some were incomplete, so they had scores below the KKM. In addition, they are also not interested in asking questions and are passive in learning activities in class. Improving students' critical thinking skills and fostering their interest in learning is very important, especially in science learning. Biology is a type of science that has concrete and abstract material concepts. One of the biological materials with complex and broad characteristics is ecosystem material (Nurfadilah and Rochintaniawati, 2021). A variety of learning models are needed so that critical thinking skills and interest in learning increase. The inquiry-based learning model can be applied, which involves asking questions, searching for information, and finding new ideas related to problems or events. One inquiry learning model suitable for ecosystem material is the Process-Oriented Guided Inquiry Learning or POGIL learning model.

The Process-Oriented Guided Inquiry Learning (POGIL) learning model focuses on students with guided inquiry and a discovery-based learning cycle that emphasizes aspects of group discussion, giving roles to each student, and questions given. This model will increase students' critical thinking skills and interest in learning. This POGIL model includes five stages: orientation, exploration, concept formation, application, and closure. With these five stages, students are expected to manage information, solve problems, and think critically by working together with group members and educators acting as facilitators (Dionisius, I Gede, and Ni Nyoman, 2019).

The POGIL learning model stimulates students to be more active in completing tasks because each student has their role in learning. It is hoped that this model can improve their critical thinking skills and interest in learning. Based on the description, it is necessary to apply the POGIL learning model to determine its effect on students' critical thinking skills and their learning interests. So, this study aimed to know the effect of the Process-Oriented Guided Inquiry Learning (POGIL) learning model on students' critical thinking skills and learning interests in ecosystem materials in Class X Man 2 Soppeng.

2) METHODS

The type of research used is quasi-experimental, using a nonequivalent control group design. The population in this study was class X MAN 2 Soppeng, totaling 199 students. The number of samples was 38 students, taken with a purposive sampling technique. The data collection instruments in this study used critical thinking skills test questions, learning interest questionnaires, and observation sheets. The analysis techniques used were descriptive analysis and inferential analysis.

3) RESULTS AND DISCUSSION

Based on the results, the pretest score in class X2 was a control class that was taught without using the POGIL model. This class taught with a model cooperative model of the Group Investigation (GI) type. It obtained an average critical thinking skill of 61.42 and an average posttest score of 73.58. There were no students who got the highest scores on the pretest. On the posttest, only two students received top scores. These scores shown in table 1.

Table 1. Categories of Critical Thinking Skills in the Control Class

Value Range	Frequency		Percentage (%)		Category
	Pretest	Posttest	Pretest	Posttest	
0 - 20	0	0	0	0	Very Low
21 - 40	0	0	0	0	Low
41 - 60	8	0	42,10	0	Moderate
61 - 80	11	17	57,9	89,47	High
81- 100	0	2	0	10,52	Very High

Based on the average pretest value obtained, 61.42, and the average posttest value of 73.58, the average value of critical thinking skills has increased, and the values remain in the same category, namely the high category. One of the causal factors is that, in the learning process, several students do not want to work together as a team, resulting in ineffective learning. In addition, the average value of learning activities, namely the oral activity indicator of the control class at the first meeting (50.87%) and the second meeting (59.06%), fell into the moderate category. Based on the results of observations of this activity, it suggested that, during learning with the GI model, students are not more active in discussing, asking questions, or expressing opinions. Students do other activities, such as sitting still, talking to friends, or bothering others. This is in line with Andriyana and Romdah's (2024) research,

which stated that implementing this GI model requires a long time allocation, students are more noisy, the division of tasks is uneven, so they are less actively involved, and they do not want to work together with other group members, which results in ineffective learning.

In class X1, an experimental class taught with the POGIL model, the average critical thinking skills in the pretest were 71.79, and the posttest score was 83.53. In the pretest, there were five students in the very high category, and that number increased in the posttest to 12 students in the very high category. The categories of Critical Thinking Skills in the Experimental Class can be seen in table 2.

Table 2. Categories of Critical Thinking Skills in the Experimental Class

Value Range	Frequency		Percentage (%)		Category
	Pretest	Posttest	Pretest	Posttest	
0 - 20	0	0	0	0	Very Low
21 - 40	0	0	0	0	Low
41 - 60	3	0	15,78	0	Moderate
61 - 80	11	7	57,89	36,84	High
81- 100	5	12	26,31	63,15	Very High

The POGIL learning model in class X2 students (experiment) showed an improvement in critical thinking skills. It is ascertained from the average pretest score of 71.79 in the high category and the posttest score of 83.53 in the very high category. The POGIL model in class X1 can help students find their knowledge so their critical thinking skills rise. This POGIL model has stages that involve the roles of students, where this division of roles can make students active by being directly involved in the learning process. Abram (2022) said that the POGIL learning model allows students to find their knowledge because they work together in teams and experience actively from the beginning of learning. Ariyanti (2021), in her research, also revealed that the stages of activities in the POGIL learning model can empower students' critical thinking skills. Inquiry-based POGIL learning improves critical thinking skills by providing direct learning experiences, processing data, discussing ideas, concluding, and forming knowledge through teamwork.

Table 3. Hypothesis Test Results

Variabel	Levene's Test for Equality of Variances		t-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed

Critical thinking	Equal variances assumed	2,402	0,130	4,102	36	0,000
	Equal variances not assumed			4,102	31,890	0,000

In Table 3, the independent sample t-test analysis has a sign value of 0.000, or the sign value is less than 0.05 (0.000 <0.05). That means the POGIL learning model has a significant influence on improving the critical thinking skills of class X students at MAN 2 Soppeng.

The POGIL model's impact on enhancing students' critical thinking abilities was further demonstrated because learning activities rose in the experimental class while they did not in the control group. The average activity value in the control class at the first meeting was 51.19% in the medium category, while the experimental class was 65.37% in the high category. Furthermore, at the second meeting, there was an increase in the average activity in the control class, namely 67.81%, and in the experimental class, 70.60% in the high category. Based on these data, the POGIL model makes students more active and thus stimulates their critical thinking skills in the learning process. It is in line with Maulira (2023), who stated that the POGIL model is good at triggering student learning activities because students are actively involved while learning and work together to find information related to the topics studied together with group friends so that they can improve their critical thinking skills.

The Process-Oriented Guided Inquiry Learning (POGIL) learning model in experimental classes can improve critical thinking skills. The steps of the model are the exploration, concept formation, and application stages. At the exploration stage, students find their knowledge through observation activities in the school environment directly to find their grasp. This follows the statement from Maylia et al. (2024) that encouraging students to find their understanding can be done by asking them to do direct activities in the field. The direct involvement of students in finding their knowledge through an activity can maximize their ability to think critically, logically, and analytically.

At the concept formation stage, they are trained to work jointly with group members in teams, exchange ideas, and train them to discuss and express opinions. According to Ngadha et al. (2023), students are expected to be active and creative in learning activities. They need to be more active in answering questions, asking questions, doing assignments, and discussing, which explicitly refers to the mastery of the subject. The activeness of students in discussions can activate their critical thinking process.

In the application stage, students are trained to express their thoughts based on the results of discussions with their group members on a worksheet by connecting the questions on the worksheet with the results of their observations. This activity trains in analyzing the opinions of group members with facts found. Thus, this activity can stimulate the critical thinking process.

Based on the explanation above regarding the POGIL stages, each stage of this model can improve students' critical thinking process skills. As explained by Ariyanti (2021), the POGIL learning model is a learning process that emphasizes an interactive process starting from thinking, discussing, understanding a concept, reflecting, and assessing work results. From the initial stage to the end of learning with this model, some activities can empower students' critical thinking skills.

Based on the research, class X2 (control) was taught without using the POGIL model, but with the investigation learning model showed an increase in students' interest in learning, as evidenced by the average pretest score of 65.32 in the high category, and the average posttest score increased by 68, also in the high category. The increase in students' interest in learning was not significant; this was caused by learning activities that did not attract students' attention. This was also testified to by the results of observations of learning activities on the emotional activities indicator at the first meeting of 50.29% in the medium category and the second meeting of 59.64% in the medium category as well.

Table 4. Learning Interest Categories in the Control Class

Value Range	Frequency		Percentage (%)		Category
	Pretest	Posttest	Pretest	Posttest	
$72 \leq X$	4	6	21,05	31,57	Very High
$60 < X \leq 72$	10	11	52,63	57,89	High
$48 < X \leq 60$	4	2	21,05	10,52	Moderate
$36 < X \leq 48$	1	0	0	0	Low
$X < 36$	0	0	0	0	Very Low

Based on Table 4., it is known that the application of the GI model in the classroom makes students less enthusiastic, less calm, and still hesitant to express their opinions in the learning process, so they are not actively involved in it. Interest in learning is the key to student activity in the learning process. A person's prime interest in learning can be seen from their activity, which comes from within themselves, and a person can follow the learning process sufficiently so that, in learning, they can also get excellent results. A person who is not interested in learning will behave inadequately with the

subject or object being studied, such as not focusing on the subject, not doing assignments, or not completing the notes given by the educator (Mulyani, 2022).

The student's interest in learning increased in the experimental class taught with the POGIL learning model. This increase is recognized from the average pretest value of 65.37 in the high category, and the average posttest value increased by 72.21 in the very high category. The increase in interest in learning is because, in the stages of the POGIL model, students are permitted to be actively involved in it, such as in the exploration stage, where they conduct observations closely with the team directly in the school environment. Learning interest categories in experimental class can be seen in table 5.

Table 5. Learning Interest Categories in Experimental Class

Value Range	Frequency		Percentage (%)		Category
	Pretest	Posttest	Pretest	Posttest	
$72 \leq X$	3	8	15,78	42,10	Very High
$60 < X \leq 72$	12	10	63,15	52,63	High
$48 < X \leq 60$	4	1	21,05	5,26	Moderate
$36 < X \leq 48$	0	0	0	0	Low
$X < 36$	0	0	0	0	Very Low

This improvement is also marked by the average value of emotional activities in the first meeting, which was 71.92% in the high category, and in the second meeting, it increased to 77.19% in the high category. Based on the observations of student activities, the POGIL model can help students resist expressing their opinions, be enthusiastic, and remain calm in following the learning process so that the learning process becomes more conducive.

The POGIL learning model provides a highly conducive discussion atmosphere; students with inadequate knowledge are not embarrassed to ask their group members, and more qualified group members help them. Thus, students will feel relaxed and comfortable following the learning process. In addition, with the exploration activities, participant activities increase because all are actively involved in learning activities (Sulasmi, 2018).

Table 6. Hypothesis Test Results

Variabel		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed
Interest in Learning	Equal variances assumed	0,173	0,680	1,615	36	0,115
	Equal variances not assumed			1,615	32,821	0,115

As shown in table 6., the independent sample t-test show a sign value of 0.115 or it can be said that the sign value is greater than 0.05 (0.115 > 0.05). This means that the H1 hypothesis is rejected so it is concluded that there is no significant influence of the POGIL learning model on students' learning interests.

The POGIL learning model requires students to be fully involved in every step of their learning where by dividing roles within the group they are trained to be responsible for their respective roles. Students who act as managers organize and lead their group members to conduct observation activities in the school environment, ensuring that other group members carry out tasks according to their respective roles. Students who act as reflectors carry out their duties by analyzing the answers of their group members to answer questions on the worksheet. The answers that have been concluded will be written by the recorder. Furthermore, the presenter will present and explain the results of their discussions and findings to other groups.

This division of roles makes students work actively in their groups so that they avoid other activities that can hinder the learning process. This also ensures that all students have the opportunity to think critically by requiring students to think rationally and reflectively, use their reasoning, and make decisions about what actions to take. The same thing was expressed by Astuti and Tarto (2020) that with various active roles, students in learning activities are able to develop critical thinking skills and improve learning outcomes. Students are encouraged to come up with new ideas and help students select various opinions, distinguish between relevant and irrelevant opinions, and those that are true and false.

Students' interest in learning is marked by their participation or involvement from the beginning to the end of learning. According to Novitasari (2021), interest in learning and involvement in learning activities are very important because they can affect the progress of the teaching and learning process.

Someone with high interest accompanied by full involvement will improve their learning outcomes and achievements to be better.

The results of this study indicate that the POGIL model has a positive impact on students' interest in learning. The use of a learning model that encourages students to participate actively will also have a positive impact on their interest in learning. Meanwhile, a learning model that encourages students to participate passively will have a negative impact on students, including low interest in learning, which will also have an impact on student learning achievement. Students who have a high interest in learning have a high level of attention, curiosity, high concentration and participate in learning activities. The learning stages in the POGIL model have a positive impact on students' interest in learning, although not significant, but the application of the POGIL model still has an influence on students' interest in learning (Noviantari and Fardaningsih, 2023).

4). CONCLUSIONS

Based on this study, the critical thinking skills of students in the control class have a value of 73.5, which is in the high category, and the experimental class has a value of 83.53 in the very high category. While the interest in learning in the control class has a value of 68.47, which is in the high category, and the experimental class has a value of 72.21, which is in the very high category, The results of the hypothesis test show that there is a significant influence of the POGIL learning model on students' critical thinking skills, with a significance value of less than 0.05 (0.000 <0.05). As for learning interest, the hypothesis test shows no significant influence of the POGIL learning model on students' learning interest since a significance value greater than 0.05 (0.115 > 0.05).

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