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The Influence of the POGIL (Process Oriented Guided Inquiry Learning) Learning Model Assisted by Mind Mapping Media on Students' Critical Thinking Ability

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Abstract: This research aims to determine whether there is an influence of the POGIL (Process Oriented Guided Inquiry Learning) learning model assisted by mind mapping media on students' critical thinking abilities. This research uses a quasi-experimental quantitative approach with a posttest nonequivalent control group design. The research sample was taken using a random sampling technique after class matching was carried out. The instrument in this research is in the form of multiple choices questions which meet the instrument quality requirements. The data analysis in this study used descriptive statistics and two independent sample tests. The results of the study obtained a t value of4,725with probability 0.000<0.050. The results of the research show that there is an influence of the POGIL (Process Oriented Guided Inquiry Learning) learning model assisted by mind mapping media on students' critical thinking abilities. This increase in critical thinking skills can be attributed to innovation in the application of mind mapping media which is still rarely used.

Keywords: Critical thinking, Mind Mapping, POGIL (Process Oriented Guided Inquiry Learning).

Abstrak: Penelitian ini bertujuan untuk mengetahui ada tidaknya pengaruh model pembelajaran POGIL (Process Oriented Guided Inquiry Learning) berbantuan media mind mapping terhadap kemampuan berpikir kritis siswa. Penelitian ini menggunakan pendekatan kuantitatif quasi eksperimen dengan desain posttest nonequivalent control group design. Sampel penelitian diambil dengan menggunakan teknik random sampling setelah dilakukan class matching. Instrumen dalam penelitian ini berupa soal pilihan ganda yang telah memenuhi syarat kualitas instrumen. Analisis data dalam penelitian ini menggunakan statistik deskriptif dan dua uji sampel independen. Hasil penelitian diperoleh nilai t sebesar 4,725 dengan probabilitas 0,000<0,050. Hasil penelitian menunjukkan bahwa terdapat pengaruh model pembelajaran POGIL (Process Oriented Guided Inquiry Learning) berbantuan media mind mapping terhadap kemampuan berpikir kritis siswa. Peningkatan kemampuan berpikir kritis ini dapat dikaitkan dengan inovasi penerapan media mind mapping yang masih jarang digunakan.

Kata Kunci: Berpikir kritis, Pemetaan Pikiran, POGIL (Pembelajaran Penyelidikan Terbimbing Berorientasi Proses).

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Introduction

Entering the industrial era 4.0 requires students to have critical thinking skills (Arsyaniva et al., 2023). Critical thinking skills are very important to help students understand and solve problems critically (Atabaki, 2015); and help solve problems and make decisions in accordance with the desired goals (Tosuncuoglu, 2018). However, in reality critical thinking skills are still a problem that occurs in schools. Tsaniyah (2020) stated that students' critical thinking abilities are still relatively low due to students' passive activities during learning. Furthermore, research by Sari et al. (2020) revealed that students are not trained enough by teachers to solve problems in the learning process in class. The same thing was also explained by Dores et al. (2020) that students' critical thinking abilities are low due to the rote learning style so that students are passive in class. This also happens at SMAN 1 Sikur in sociology subjects, the students' low critical thinking skills are caused by a passive learning process, teachers rarely use interesting learning media. The learning method also involves more lectures.

Therefore, efforts that can be made to overcome the problems described above are to apply the POGIL (Process Oriented Guided Inquiry Learning) learning model. The POGIL model allows students to gain critical thinking skills because the learning process using the POGIL model supports students to be more active in processing information, improving teamwork or group collaboration, and communication and then the teacher in the class acts as a facilitator (Makmun et al., 2018). Several study results show that the POGIL (Process Oriented Guided Inquiry Learning) model has a positive effect on students' critical thinking abilities (Wijaya & Handayani, 2021), student learning outcomes (Putra et al., 2022; Putri & Gazali, 2021). Apart from that, the results of other studies also show that the POGIL (Process Oriented Guided Inquiry Learning) model has a significant effect on problem solving abilities (Sari et al., 2021) and concept understanding abilities (Cascolan, 2019).

Based on some of the findings presented above, it can be seen that the POGIL (Process Oriented Guided Inquiry Learning) model is effective in improving students' critical thinking skills. However, these findings are mostly carried out on learning outcomes, problem solving abilities, and also the ability to understand concepts, while not much research has been done on critical thinking abilities. Apart from that, in previous findings, only a few studies used mind mapping media to improve students' critical thinking skills in sociology subjects.

Method

This research involved control and experimental classes, the control class remained with the conventional model, while the experimental class used the POGIL (Process Oriented Guided Inquiry Learning) model. All class XI students in this study were used as the population. Sampling is carried out by:*random sampling technique*after matching. Data is collected through a multiple choice test that has been verified to ensure its validity. Data is declared valid if the sig value. < 0.05 (Janna & Harianto, 2021). Of the total 30 multiple choice items, 20 questions were declared valid. Testing the validity of the instrument uses the product moment technique.

The analysis technique uses descriptive statistical analysis to determine whether the data obtained can be analyzed using parametric or non-parametric statistics (Sugiyono, 2018). This analysis is presented in table form which includes the average, standard deviation, and percentage of learning outcomes (Yahya, 2019). Before carrying out the test, first use a requirements analysis test.

To find out whether the data is normally distributed or not, you need to carry out a normality test using Kolmogorov-Smirnov with the help of SPSS 26 for Windows. Data can be stated to be normally distributed if sig. > 0.05 (Surdinata et al., 2018). And the homogeneity test uses the F test with the help of SPSS 26 for windows. Data is said to be homogeneous if the probability value is sig. > 0.05 with a sig level of 5% (Usnalillah et al., 2023).

Hypothesis testing was carried out to determine whether or not there was an influence of the POGIL model (*Process Oriented Guided Inquiry Learning*) assisted by mind mapping on students' critical thinking abilities. If the data meets the requirements for normality and homogeneity analysis, the researcher will use a parametric test, namely the Two Independent Sample Test with the help of SPSS 26 for Windows. If the probability value is sig. < 0.05 with a significance level of 5% then Ho is rejected (Seran et al., 2019).

Results and Discussion

Results

The research results for each class are presented in the following tables and figures:

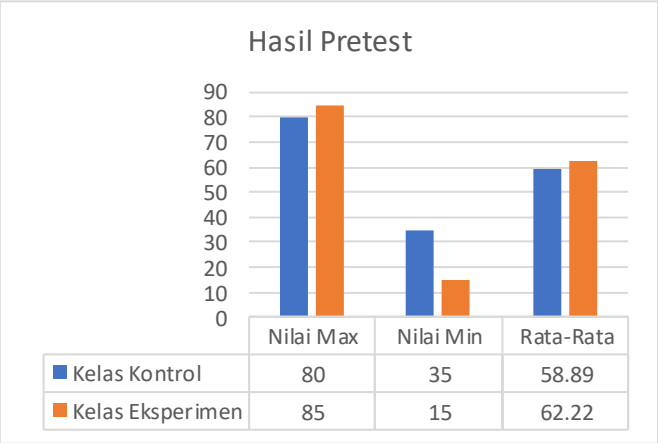

Figure 1. Pretest Results Graph

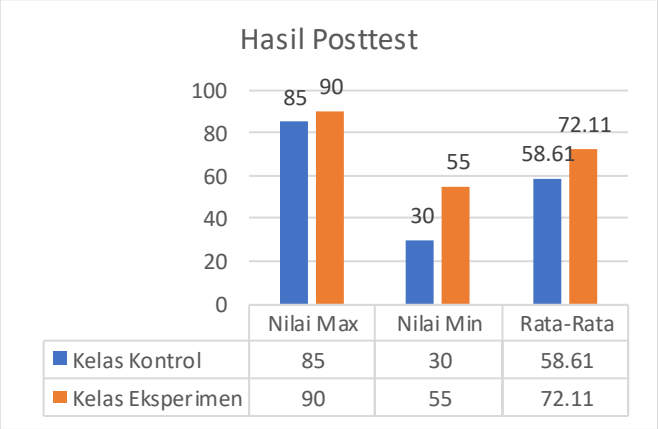

Figure 2. Posttest results graph

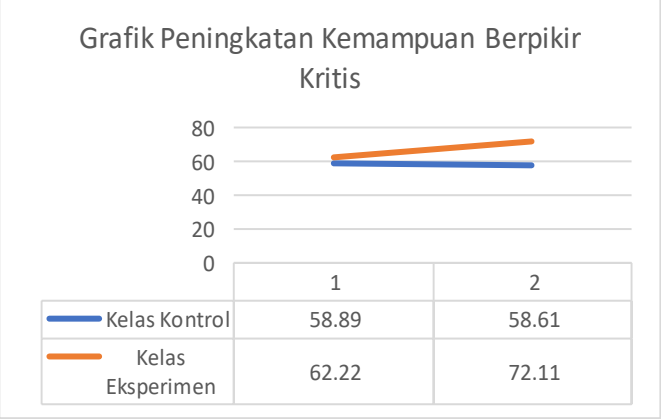

Figure 3. Critical Thinking Improvement Graph

By using the graph provided previously, it can be seen that the experimental class uses POGIL (Process Oriented Guided Inquiry Learning) assisted by mind mapping had a pretest of 62.22, compared to the control class which used the conventional model which achieved a pretest of 58.89. On the other hand, the posttest for the experimental class showed an improvement by reaching 72.11, while the control class reached 58.61. From this comparison, it can be seen that there are differences between the two classes. Experiments using the POGIL (Process Oriented Guided Inquiry Learning) model assisted by mind mapping showed greater improvement from pretest to posttest than the conventional model control class. This proves that the model has an impact on students' critical thinking abilities.

Test Requirements

Normality Test

The analysis requirements for this research are carried out by carrying out the Kolmogorov-Smirnov test. Normality testing was carried out using SPSS 26 for Windows. A summary of the experimental and control results is visualized in table 3 below.

Table 3. Summary of Normality Test Results

N		36
Normal Parameters, b	Mean	,0000000
	Std. Deviation	9.12312755
Most Extreme Differences	Absolute	,104
	Positive	,080
	Negative	-,104
Statistical Tests		,104
Asymp. Sig. (2-tailed)		,200c,d

The results of the normality test with a significance level of 5% above show that the significance value obtained Sig. 0.200 > 0.05. This shows that the data *posttest* in the control class and experimental class normal distribution.

		Levene Statistics	df1	df2	Sig.
Critical Thinking Ability	Based on Mean	,232	1	70	,632
	Based on Median	,191	1	70	,663

Based on Median and with adjusted df	,191	1	59,471	,663
Based on trimmed mean	,220	1	70	,641

Summary of Table 4 shows that the value 0.632 > 0.05. It was concluded that the experimental and control posttests were normally distributed.

Class	N	Mean	Std. Dev	Max	Min	t value	Sig.	Ket.
Posttest Control	36	58.61	14,323	30	85	4,725	0,000	Ho Rejected
Posttest Experiment	36	72.11	9,420	55	90	4,725	0,000	

Based on the results of the hypothesis above, the Sig (2-tailed) value is 0.000 and the probability is 0.05. Sig. 0.000 < 0.05 then Ho is rejected. The results of this analysis show that the application of the model POGIL (Process Oriented Guided Inquiry Learning) assisted by mind mapping has an influence on improving critical thinking skills in sociology compared to using conventional models.

The results of this research indicate that Sig. 0.000 < 0.05. The experimental class has a mean (72.11) > control class mean (58.61). The criteria in this research are if Sig. < 0.05 then Ho is declared rejected. This shows that the application of the POGIL (Process Oriented Guided Inquiry Learning) learning model assisted by mind mapping media has a positive contribution to increasing the results of students' critical thinking abilities and understanding of the material because it encourages students to be more active and participatory in group work with peers. Not only that, learning using mind mapping media also increases students' interest and interest, making the learning process more effective and not boring.

The results of this research strengthen research from Prihatami, E. (2020) that the application of the POGIL model helps develop students' mathematical critical thinking skills. This is because learning requires students to have a deeper understanding of the subject matter, the ability to think to solve problems, and good communication. In addition, each student is expected to take a different role and play an active role during the discussion. This is similar to Wijaya and Handayani (2021) study in classes that use the POGIL model, students work collaboratively in groups. Students tend to participate actively in class discussions to make learning interesting rather than boring and create a sense of healthy competition between groups.

As for the research results of Ramdani and Sedijani (2017), the POGIL learning model has been proven to produce an increased understanding of learning concepts compared to conventional models. This is because the POGIL model makes it easier for students to understand learning material because it is taught through team or group collaboration in solving questions and problems given by the teacher.

From the explanation above, it can be concluded that the POGIL (Process Oriented Guided Inquiry Learning) model used at SMAN 1 Sikur, makes a significant contribution to increasing students' active role in the learning process. Through active discussions and the process of exchanging ideas with other groups, students can improve their ability to think compared to using conventional models. Not only that, students also feel happier and more confident in expressing their own opinions.

The POGIL (Process Oriented Guided Inquiry Learning) learning model has advantages, namely: it allows students to develop scientific and rational thinking. Students as learners can solve their own problems and gain new knowledge through investigation and observation, so that students can understand the concepts taught by the teacher (Syafaati & Harun, 2018).

POGIL (Process Oriented Guided Inquiry Learning) is an inquiry learning model that focuses on the process and is student-centered. It is designed for small groups of students working with a teacher or instructor as a facilitator (Cahyaningrum et al., 2019). In this learning process, students are trained to build their own cognitive skills, provide opportunities to practice scientific process skills, and encourage creativity in thinking. In this way, the concepts studied are easy to understand and proven through experiments to develop scientific process skills, and students are given the opportunity to evaluate their performance and think about how to improve their shortcomings. (Ramdani & Sedijani, 2017).

Furthermore, the research results of Wardhani et al. (2022) found that the use of mind

mapping media improved students' critical thinking abilities in learning. Tseng's (2020) research results also confirm that the use of mind mapping media has a positive effect on the development of many cognitive abilities related to critical thinking. Furthermore, the research results of Faradilla et al. (2024) the use of mind mapping learning media using the Problem Based Learning learning model can improve students' critical thinking skills. Thus, this research shows that using mind mapping media can be an effective support for implementing the POGIL (Process Oriented Guided Inquiry Learning) model.

From the explanation above, it is concluded that the application of the POGIL (Process Oriented Guided Inquiry Learning) model with the help of mind mapping media results in more active, creative learning and increases in response to material. The application of the POGIL (Process Oriented Guided Inquiry Learning) model supported by mind mapping media allows learning to be more student-centered and provides direct experience to students.

Conclusion

Based on the research results, it was concluded that the use of the POGIL (Process Oriented Guided Inquiry Learning) model with the help of mind mapping media had an influence on students' critical thinking abilities in sociology subjects. Research shows that experiments using the POGIL (Process Oriented Guided Inquiry Learning) model are superior when compared to using conventional models. To improve sociology results, teachers can try to adopt the POGIL (Process Oriented Guided Inquiry Learning) model assisted by mind mapping.

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