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The Effect of Chemical Learning Interest on Students' Critical Thinking Skills in Periodic System Materials

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ABSTRACT
The ability to think critically is the ability to identify and formulate a problem, which includes determining the point, finding similarities and differences, extracting relevant information and data, the ability to consider and assess, which includes distinguishing between facts and opinions, finding assumptions or assumptions, separating prejudices and emotional influence, considering consistency in thinking and drawing reliable conclusions based on relevant data and estimating the consequences that may arise. Interest in learning is one of the internal factors that affect student achievement. The students will be more interested in learning something they like and their interests are also related to the students' motivation and emotions. This study aims to see the effect of chemical learning interest on students' critical thinking skills on the periodic system material. The subjects of this study were students of class X MIA 5 and X MIA 7. Measurement of students' critical thinking skills using questions arranged based on indicators of critical thinking skills and to see student's interest in learning using a learning interest questionnaire adjust to chemistry learning. The student learning interest questionnaire is arranged based on a Likert scale. Respondents indicate agree or disagree with the order of questions about the object of attitude. The test instruments and questionnaires used are valid criteria. Testing data using the SPSS 20 for windows program, it is known that the level of importance also affects the significant value of 0.001 is less than 0.05. This price indicates that students' critical thinking skills influence the differences in the level of interest in learning chemistry.

Keywords: *Interest in Learning, Critical Thinking, Guided Inquiry*

1. INTRODUCTION

Students' chemistry learning achievement decreased due to their low interest in learning chemistry. Students believe chemistry lessons are difficult, most teachers and students agree that learning difficulties are related to learning materials, facilities and infrastructure, teachers and learning methods used [10]. Some students blame themselves for not listening to learning well [10]. Some difficulties can encourage the low interest of students in chemistry lessons.

Interest in learning is one of the internal factors that affect student achievement. Interest can be defined as a tendency or someone's interest in an object. According to Hidi, interest is a unique psychological thing that occurs between a person and the object he is interested in [1]. Students will be more interested in learning something they like and their interests are also related to students' motivation and emotions [6].

In this era of education 4.0, there is a combination of technical skills and human skills that require HR (Human Resources) to be optimized in terms of creativity, critical thinking, problem-solving, communication, collaboration, and empathy. Schools and teachers must pay more attention to the thinking level of their students so that they can reach a higher level of thinking.

Critical thinking skills of students in high school have sufficient critical thinking skills [9]. This means that at this level students should be given a treatment that can improve students' critical thinking skills. This is one of the potentials that must be improved by the teacher.

Critical thinking skills are the ability to identify and formulate a problem, which includes determining the essence, finding similarities and differences, extracting relevant information and data, the ability to consider and assess, which includes distinguishing between facts and opinions, finding assumptions or assumptions, separating

prejudices and emotional influence, considering consistency in thinking and drawing reliable conclusions based on relevant data and estimating the consequences that could arise [4]. Critical thinking is also a directional and clear process that is used in mental activities such as solving problems, making decisions, persuading, analyzing assumptions, and conducting scientific research [3].

Students' critical thinking skills in chemistry learning cannot be done by memorizing and memorizing (C1), explaining (C2), applying (C3), but it needs to be connected with analysis (C4), synthesis (C5) and evaluation (C6), so that students can improve critical thinking skills [7].

Therefore a teacher must be able to create or establish a learning model that can improve critical thinking skills and student interest so that learning becomes easier and more interesting in accordance with the material being studied. Students who have critical thinking skills and good interests will find it easier to understand learning. These critical thinking skills are very useful in solving problems faced in learning activities even in everyday life.

The decrease in interest makes students lazy to think and lazy to solve problems given by the teacher in learning so that students find it difficult to understand the learning given by the teacher.

In this study, the learning model used is the learning model Guided Inquiry-based Collaboration as an experimental class and Direct Instruction as a control class. Amijaya concluded in his research that the guided inquiry learning model had a significant positive effect on learning outcomes and critical thinking skills of class X students [2]. Damayanti stated in his research that there was an effect of interest in learning on the learning outcomes of class XI students by applying the inquiry learning model [5].

Therefore, in this study, it will be seen the influence of high interest in chemistry learning and low interest in learning chemistry on students' critical thinking skills on the periodic system material.

2. RESEARCH METHODS

This research uses quantitative methods, two-way ANAVA experimental research. Testing data using the SPSS program 20 for windows.

Data collection techniques in this study were a critical thinking skill test and a questionnaire of interest in learning chemistry. The critical thinking skills test is compiled and developed by researchers themselves based on the Periodic System material which is arranged according to indicators of critical thinking skills.

The questionnaire serves to see students' interest in learning after the learning process is carried out. The student learning interest questionnaire is arranged based on a Likert scale. Respondents indicate agree or disagree with the order of questions about the object of attitude. The test instruments and questionnaires used are valid criteria.

The class used consists of two classes, namely the experimental class and the control class. The experimental class is taught with the learning model Guided Inquiry-based Collaboration assisted by Lectora Inspire and the control class is taught using the learning model Direct Instruction.

3. RESULT AND DISCUSSION

After the research was carried out, the research results were obtained in the form of data on the results of critical thinking skills and data on students' interest in learning chemistry in the periodic system material for class X.

Data on the results of critical thinking skills were obtained using multiple-choice test questions with the cognitive level C3-C5. Thomas and Thorne explain the Bloom taxonomy level used in HOTS, namely analyzing, evaluating, and creating [8]. This test data is in the form of data pretest and posttest, then the increase in critical thinking skills is calculated by calculating the value Gain.

The critical thinking skills test is compiled and developed by researchers themselves based on the Periodic System material which is arranged according to 5 indicators of critical thinking skills.

Table 1. Five indicators of critical thinking skills

Indicators	Operational Words
Provide simple explanations	Analyze statements, submit and answer clarifying statements
Build basic skills	Assess the credibility of a source, research, assess research results
Make information	Reduce and assess deduction, induce and assess induction, make and assess valuable judgments
Make further explanations	Define terms, assess definitions, identify assumptions
Set strategies and techniques	Decide on an action, interact with others

The indicator of critical thinking skills above will be a reference in the preparation of tests of students' critical thinking skills on the periodic system material.

Data on students' interest in learning chemistry were obtained from the results of the interest in learning questionnaire given at the end of the learning meeting. Data on interest in studying chemistry are grouped into

two, namely high learning interest and low learning interest. The number of questions in the questionnaire is 25 items.

Table 2. Student's chemistry learning interest instrument grid

No	Indicator
1	Expectations to succeed in chemistry lessons
2	Hard work in chemistry
3	Responsibilities in learning chemistry
4	Solutions to achieve better results
5	Worries about failure
6	Trying to find solutions to solve problems
7	Student motivation in learning chemistry

The questionnaire was developed according to the points in the table above. This is to make it easier for users to compile an interest in learning a questionnaire that is tailored to learning chemistry.

Testing data using the SPSS program 20 for windows to measure students' interest in learning chemistry and critical thinking skills. Then the results of the two-way ANOVA test are obtained as follows:

Table 3. Summary of the two-way analysis (ANOVA)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Correcte dModel	1513[a]	3	0.504	13 898	.000
Intercept	12,172 335,370	1		12,172	.000
Interests	0.429	1	0.429	11,820	.001
Error	2359	65	0.036		
Total	17,917	69			
Correcte d Total	3,873	68			

a. R Squared = .391 (Adjusted R Squared = .363)

The results of hypothesis testing using two-way ANOVA in Table III. obtained P-value 0.001 <0.05, so it can be said that there is a difference in the effect of high interest in chemistry learning and low interest in chemistry learning on students' critical thinking skills on the periodic system material.

When viewed from the results of critical thinking skills obtained in the experimental class and the control class, there are differences in critical thinking skills based on the level of interest in learning chemistry. The differences in students' critical thinking skills at the students' chemistry learning interest level are presented in Table IV.

Table 4. The average n-gain of critical thinking skills based on the students' interest in learning chemistry (high and low) in chemistry teaching

Interest	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Lower Bound
High	0.526	0.035	0.456	0.456
Low	0.347	0.041	0.265	0.265

Based on the data in table 4, the average value of N-gain critical thinking skills from the two classes (experiment and control) which have a different level of interest in learning chemistry with N-gain critical thinking skills which have a low level of interest in learning chemistry. The average result obtained by students with a high interest in learning chemistry was 0.526 higher than the average obtained by students with a low interest in learning chemistry, namely 0.347. Thus there is a difference in the average N-gain difference in critical thinking skills who have high interest in learning chemistry with low interest in learning [11].

The difference in the effect of students 'interest in learning chemistry on students' thinking skills is shown in Fig. 1.

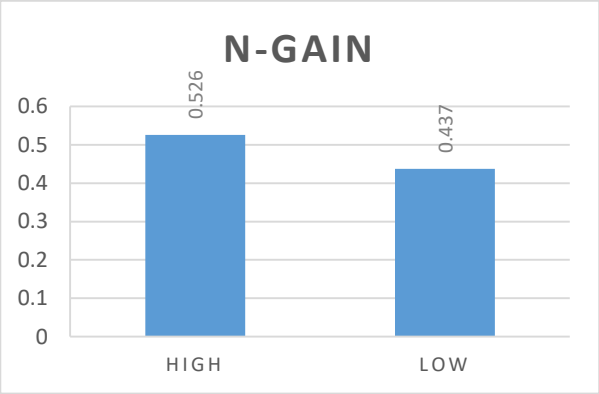

Figure 1 Average graph of N-gain critical thinking skills based on students' interest in learning chemistry.

From the Figure above it can be seen that the average result obtained by students with high interest in learning chemistry is 0.526 higher than the average obtained by students with a low interest in learning chemistry amounting to 0.347. thus there is a difference in the average N-gain of critical thinking skills who have a high interest in learning chemistry with a low interest in learning.

4. CONCLUSION

The conclusion of this study is that there is a difference in the effect of high interest in chemistry learning and low interest in learning chemistry on students' critical thinking skills on the periodic system material because the P-value is 0.001 smaller than 0.05.

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