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The Influence Of The Flipped Classroom Model and Independent Learning on The Critical Thinking Capability Of Science and 5 Class Students in Primary School

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ABSTRACT
The low quality of education in Indonesia can be seen, among other things, at the basic education level. According to the TIMSS & PIRLS International Study Center survey, it shows that the quality of basic education in Indonesia, especially in the field of science, is only ranked 44th out of 47 countries that took part in the assessment with an average science score of 397. *Aim:* This research aims to determine the extent of the influence of the flipped classroom model and independent learning on scienceas critical thinking skills. *Method:* This research is a type of quantitative research that discusses The influence of the flipped classroom model and independent learning on the science and science critical thinking abilities of fifth grade elementary school students. The method used in this research is a quasi-experimental method which is a development of the pure experimental method of analysis of variance (ANOVA) with a 2x2 treatment by level design. The techniques for collecting data are questionnaires, tests and documents. The sampling technique uses a stratified random sampling procedure. *Results and discussions:* Based on the results of the research conducted, there was an interaction between the flipped classroom model and independent learning on critical thinking skills in Science and Technology. The results of the ANOVA test showed that the Fcount value = 19.28 and the Ftable value = 4.11 at the level □ = 0.05. These results show that Fh > Ft so that there is an interaction between the use of the flipped classroom model and independent learning in influencing students' science and science critical thinking abilities. *Conclusion:* Based on the results of data analysis, hypothesis testing and research discussion results, it can be concluded that there is a positive and significant influence of the flipped classroom model and learning independence on the thinking ability of social science students in grade V of elementary school.

Keywords: Flipped Classroom Model, Learning Independence, Critical Thinking Ability

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INTRODUCTION

The low quality of education in Indonesia can be seen at the level of basic education, among others. According to the TIMSS & PIRLS survey *International Study Center* (2016) shows that the quality of basic education in Indonesia, especially in the field of science, is only able to rank 44 out of 47 countries that participated in the assessment with an average science score of 397. Other data from PISA day released by the OECD in the study *Programmed for International Student Assessment* (PISA) (2018), Indonesia is ranked 74th out of 79 countries with a science score of 389, far from the OECD average score of 489. From the results of the two surveys, it can be concluded that human resources in Indonesia are still lacking in the field of education, especially in the field of science and critical thinking skills.

Critical thinking skills have become one of the higher-level thinking skills (*High Order Thinking Skill*). Critical thinking skills are students' ability to solve problems and make decisions. According to Ennis (1991) Critical thinking is a reasonable thought to decide something that can be believed and done based on scientific thinking. According to Putri et al (2019) Explaining that critical thinking skills are thinking skills that have reason and are reflective of what is believed and done. Resti (2020) Concluding critical thinking is a process of thinking in a more detailed or deeper direction. According to Firdaus (2021) Explaining critical thinking is the ability to analyze based on logical reasoning. Ennis (Nugraha, 2018) Describe critical thinking skills as follows: 1) Recognize problems 2) Find ways to deal with problems 3) Collect and organize information 4) Identify unstated assumptions and values 5) Understand and use appropriate, clear and unique language 6) Evaluate facts and evaluate statements 7) Identify logical relationships 8) Draw conclusions 9) Test equations and draw conclusions 10) Reframe belief patterns own based on more experience.

According to Wihartanti (2021) Students who have the ability to think critically have the following characteristics: 1) identify problems intelligently, 2) like to collect data as factual evidence, 3) be able to interpret pictures or cartoons, 4) provide explanations of understanding, definitions, reasoning and other problems. controversial issues, 5) being able to list

all possible consequences or alternative solutions to certain problems, ideas and conditions, 6) being able to draw conclusions from existing and selected data. According to Rahayu (2018) Assign indicators of critical thinking skills in students, including building basic skills, giving simple ones, explaining, and setting strategies and tactics.

Based on the research and observations conducted by the researcher, it was found that the critical thinking ability of class V students at SDN Cakung Barat 02 class V is still relatively low. Only 32% of the students were able to solve the questions with the right answers. This is also strengthened by the average learning outcomes of class V science which shows results below average, namely only 46% of students can exceed the KKM score of 70. The influence of the learning model on students' problem-based critical thinking skills, this is in line with research Anonymous (2020) Titled Students' Critical Thinking Skills through the Problem Based Learning Model and Project Based Learning Model, it is explained that there is a significant influence between problem-based learning and the critical thinking skills of elementary school students. In addition to implementing a student-centered learning model, the flipped learning model can be used as an option to increase student independence. Sukmawati (Widodo et al., 2021) revealed that learning independence is important to be applied at the elementary school level. Dwi Rachmayani (Khardita et al., 2023) Explaining learning independence is a process where an individual can take the initiative to diagnose his or her learning needs, identify learning resources, formulate learning objectives, select and implement suitable learning strategies to evaluate his or her learning outcomes. Hidayat (2024) Explaining that the research on applying a flipped class will have an impact on the progress of the education program. According to Savitri (2022) type *flipped classroom* is one of the active learning models.

METHOD

The research method used in this study is experimental. The experimental method used in this study is a pseudo-experiment (quasi experimental design) with a quantitative approach with a variance analysis approach (ANAVA). The use of this method intends to determine the influence of the learning model Flipped Classroom and learning independence towards the ability to think critically of social science students. This research uses a design treatment by level 2x2 posttest only control design Bausell (1994).

The population in this experimental study is students of class V of SD Negeri Cakung Barat 02 consisting of classes VA and VB. Each class has 30 students, so the total population in this study is 60 students. The sample included in this study amounted to 40 people from 20 students in class VA and 20 students in class VB. This sample was selected through a stratified random sampling procedure. The treatment was given to two research classes, namely the experimental class and the control class as many as 6 meetings. The experimental class uses the flipped classroom model and the control class uses the expository model.

In this study, the data collection technique uses test and non-test instruments. The test and non-test contain several questions that must be answered by the respondent. The test in this study is to collect data on students' social science critical thinking skills, while the non-test used is a questionnaire to find out the students' learning independence. The type of instrument used to collect data on students' critical thinking skills is in the form of descriptive questions about the material n the science and science subject. Each indicator in the IPAS critical thinking ability instrument is assessed using the IPAS critical thinking ability rubric that has been developed by researchers. The instrument of learning independence is a questionnaire using an assessment rubric. The questionnaire scale used in this study is the summated rating scale. The Likert Scale is used to measure the attitudes, opinions, and perceptions of a person or group of people about social phenomena. In this study, using a questionnaire in the form of a checklist in the form of positive and negative statements, students only chose one of the answers from the 5 categories provided. All instruments for data collection have been tested first so that the validity of the instrument can be known. The validity test carried out is an internal validity test, that is, validity is achieved if there is a conformity between the parts of the instrument.

The analysis of this research data, to answer the hypotheses that have been made, requires the help of the SPSS version 25 program and Microsoft Excel to analyze and statistically process the research data that has been processed. To answer the hypotheses in this study, Two-Way ANOVA Variant Analysis was used using a 2 x 2 factorial design. Before processing data using ANAVA, it is necessary to calculate the normality test and the data homogeneity test in each group that is given treatment first. To continue the test

RESULTS AND DISCUSSION

Results

Based on the research data obtained, the score of critical thinking ability in the group of students who were treated using the flipped classroom model was 18 for the lowest score and 29 for the highest score. The data is presented in the form of a frequency table consisting of a number of 6 classes, with an interval length of 2, an average of 24.3 and a standard deviation of 2.8855.

From the table above, the group of students who learned with the flipped classroom model showed that there were 35% of students who scored below the average class, 25% of students in the average class and 40% of students who were above the average class. The following researcher presents a histogram image of the critical thinking ability score of students who learn using the flipped classroom model in the following image:

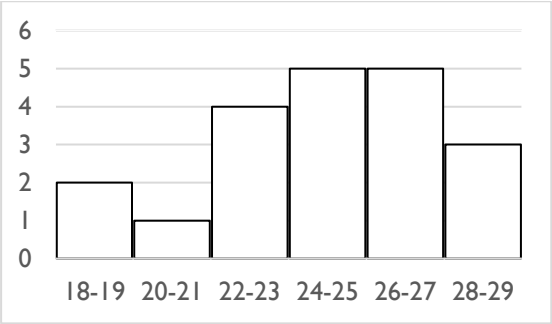

Figure 1. Critical thinking ability scores of students who are given learning model flipped classroom

Based on the figure above, it can be seen that the interval class of 18-19 is 2 people or 10%, the interval class of 20-21 is 1 person or 5% of the total data is the class with the lowest frequency score. The interval class of 22-23 amounted to 4 people or 20%, the interval class of 24-25 and 26-27 each amounted to 5 people or 25% of the total data and became the class with the highest frequency score, the interval class of 28-29 amounted to 3 people or 15%.

Based on the research data obtained, the score of critical thinking ability in the group of students who were treated using the expository model was 17 for the lowest score and 27 for the highest score. Subsequently, the data is presented in the form of a frequency table with the number of class 6, with an interval length of 2, an average of 22.65 and a standard deviation of 2.6413.

The group of students who studied with the expository model showed that there were 30% of students who scored in the average class. 20% of students are below the average class and 50% of students are above the average class. The following researcher presents a histogram image of the critical thinking ability score of students who learn using the expository model:

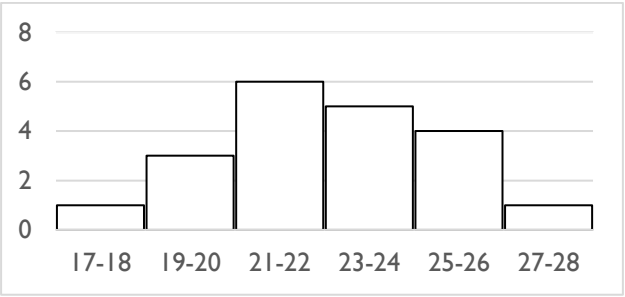

Figure 2. Critical thinking ability scores of students who are given learning with an expository model

Based on the picture above, it can be seen that the interval class of 17-18 is 1 person. Interval class 19-20 totals 3 people, interval class 21-22 totals 6 people, interval class 23-24 totals 5 people, class 25-26 totals 4 people and interval class 27-28 totals 1 person. The highest frequency score is located in the interval class 21-22 of 6 people or 30% of the total data, while the lowest score is located in the interval class of 17-18 and 27-28 each of 1 person or 5% of the total data.

Were obtained, so the critical thinking ability score in the group of students who had high learning independence was given treatment using the flipped classroom model is 25 for the lowest score and 28 for the highest score. Furthermore, the data is presented in the form of a frequency table with the number of classes 4, the length of the interval 1, the average is 26.6 and the standard deviation is 1.1738 for the distribution of critical thinking skills.

The group of students with high learning independence who were given learning using the flipped classroom model showed that there were 30% of students who scored in the average class, 20% of students who scored below the average class and 50% of students who scored above the average class.

Were obtained, the score of critical thinking ability of students who had low learning independence taught using the flipped classroom model was 18 for the lowest score and 24 for the highest score, then the data was presented in the form of a frequency table with the number of classes 4, interval length 2, mean 22 and standard deviation 2.1082.

Group of critical thinking skills of students who have. Low learning independence using the flipped classroom model shows that there are 40% of students who score in the average class, 30% of students are below the average class and 30% of students are above the average class. The following is a histogram image of the critical thinking ability score of students who have low learning independence using the flipped classroom model:

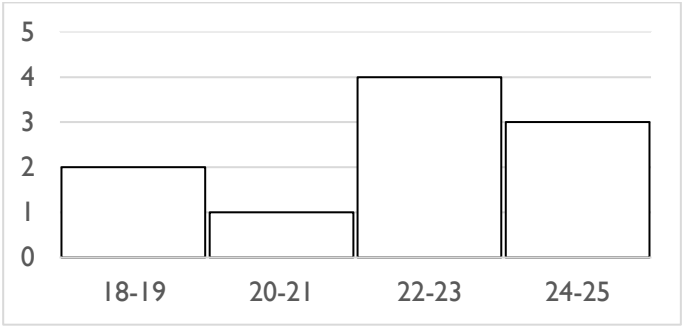

Figure 3. Critical thinking ability scores of students who are given learning with an flipped classroom model

The findings obtained in this hypothesis are that there is a significant difference in the critical thinking ability of students who are taught using the flipped classroom model and students who are taught using the expository model. The critical thinking ability of students who are taught using the flipped classroom model is higher than that of students who learn using the expository model.

This is because there are different steps taken by students during the learning process. Students who are given learning using the flipped classroom model through the pre-class phase first compared to students who are taught using the expository model. In the pre-class phase, students are given teaching materials before the main learning activities are carried out, in order to study the material at home, make a material resume

and list the questions that students find when undergoing the pre-class phase. This certainly encourages students to be more prepared in solving the problems they will face in the learning process in the classroom because students have made preparations outside the classroom (at home). With this mature readiness, it will certainly encourage students' critical thinking skills in learning, especially in responding to learning problems and investigating solutions in relation to learning materials.

The results of the above analysis are also strengthened by the results of previous research conducted by Sitanggang (2021) About Learning Experimentation flipped classroom on the learning outcomes of students in the basic electrical and electronics subject class X TITL SMK Negeri 5 Medan. The study shows that the learning outcomes of students who are taught using the flipped classroom achieving an average of 85.93 higher than students who were taught using the expository model which reached an average of 73.55. From the results of the research, it can be concluded that the learning outcomes of students who are taught using the flipped classroom better than the learning outcomes of students who are taught using the expository model. Anonymous (2017) explained that the Flipped Learning model has higher learning outcomes than students who are taught with the direct learning model.

In accordance with previous research conducted by Molidah et al (2017) explaining the results of the data analysis obtained shows in general the application of the learning model flipped classroom It is effectively used to improve students' critical thinking skills. There was an increase in critical thinking test results between before and after the model was applied flipped classroom in the aspect of simple analysis, building basic skills, making conclusions, making further explanations, as well as strategies and tactics in learning. There is a difference in the critical thinking ability of students who have low learning independence who are taught using the flipped classroom lower than students who have low learning independence who are taught using an expository model.

This is because students are not able to optimize their knowledge and understanding as a whole so that the information received will be partially digested, stored in short-term memory or even just missed. Through the role of teachers as facilitators in learning, students with low learning independence will be trained to develop their abilities through the flipped classroom model. In the syntax, students will go through the pre-class, in-class, and application phases that require students to be actively involved in learning. Learning activities with the flipped classroom model have advantages that can be applied to train the characteristics of students with low learning independence, namely in the learning process, the flipped classroom model can foster effective independent learning habits and encourage students to take responsibility for the learning they do themselves when carrying out the pre-class phase stage at home. This, of course, requires cooperation between teachers and parents to monitor the implementation of the pre-class phase so that it runs optimally at home with parental supervision. In addition, the use of learning videos that are accessed online at home encourages students' enthusiasm in accessing learning flexibly, because they are not tied to time, are free in the space to move at home, and allow students to repeat the material to deepen their understanding. With a deep understanding, of course, it can encourage students to be more prepared in solving problems in learning, and with a good understanding it also encourages student involvement in learning. In the end, learning will be focused and directed to achieve a productive learning process and outcomes.

Meanwhile, students who have low learning independence using the expository model will experience difficulties in independent learning in the learning process, because each stage in learning the expository model of students is continuously guided so that they do not train students' learning independence. For students who have low learning independence, it will be difficult to decipher the variables contained in complex materials. Students with low learning independence have the characteristic of being less able to optimize knowledge and understanding in depth and comprehensively. All information received will be partially stored in short-term memory or even just missed. The results of the above analysis are strengthened by research conducted by Mirlanda (2019). The results of the two-way variance analysis produced a value of Fo = 55.08 > 4.04 = Ftable, indicating that the students of the experimental class with the model flipped classroom experienced an increase in learning independence better than the control class. In addition, there is an increase in the average student learning independence in the classroom flipped classroom by 37% higher than the average increase in the control class which was 29%.

CONCLUSION

Based on the results of data analysis, hypothesis testing and research discussion results, it can be concluded that there is a positive and significant influence of the flipped classroom model and learning independence on the thinking ability of social science students in grade V of elementary school. The results of the critical thinking ability of science science students who used the flipped classroom model obtained an average score of 24.3 and students who were taught using the expository model obtained an average score of 22.65. The results of the critical thinking ability of the science science group of students who have high learning independence taught using the flipped classroom model obtained an average score of 26.6 and the group of students with high learning independence who were taught using the expository model obtained an average score of 21.9. The results of the critical thinking ability of the science science group of students with low learning independence who were taught using the flipped

classroom model obtained an average score of 22 and the group of students who were taught using the expository model obtained an average score of 23.4. There was an interaction between the flipped classroom model and learning independence on the critical thinking ability of social studies students. Based on the results of the ANAVA test, two pathways were decided to reject Ho and accept Ha with the acquisition of Fcal = 19.28 and Ftabel = 4.11 at the level □ = 0.05. So that Fh > Ft or there is an interaction between the use of the flipped classroom model and learning independence on the critical thinking ability of social science students.

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