

THE INFLUENCE OF PROBLEM-BASED LEARNING AND GROUP INVESTIGATION LEARNING MODEL ON CRITICAL THINKING SKILLS AND STUDENTS' LEARNING MOTIVATION

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Abstract

The purpose of this study was to examine the effect of the PBL and GI learning models on students' critical thinking skills and student 's motivation. The procedure of the research used data collection methods with survey and test techniques (pretest and post - test). The data analysis techniques were research instrument validation test, research instrument reliability, normality test, homogeneity test, One Way Anova test and LSD Post-Hoc test. The results of the research using the PBL and GI learning models have a significant effect on critical thinking skills, a significant value of $0.00 < 0.05$ and students' learning motivation gets a sig assessment. $0.00 < 0.05$ which is stated to have a significant effect. Data testing was continued with the LSD Post-Hoc test to see a comparison of the effect on the use of the PBL learning model with the GI and the results were significantly different, namely the PBL model was a model that had more influence on critical thinking skills with a value of $0.039 < 0.05$ and on learning motivation with a value of $0.039 < 0.05$. $0.046 < 0.05$ compared to the GI model. The conclusion from this study is there is an effect of PBL and GI learning models on critical thinking skills and learning motivation of students of grade XII of WR Soepratman Catholic High School No. 020 Samarinda.

Keywords: *Problem-Based Learning, Group Investigation, Critical Thinking Skills, Learning Motivation.*

Education in Indonesia in the 21st century is now faced with a century of openness or globalization, marked by fundamental changes that are different from the way of life of the previous century, as well as rapid developments in the fields of science and technology. technology which causes challenges new where sued source power quality human beings in order to be able to overcome various problems of life global.

The 21st-century learning paradigm formulated by the Ministry of Education and Culture emphasizes the ability of students to find out from various sources, formulate problems, think analytically, and collaborate and collaborate in solving problems (Ministry of Education and Culture Research and Development, 2013). BSNP (2010) explains that the 21st century learning *framework includes* (1) *Critical-Thinking and Problem-Solving Skills*, able to think critically, laterally, and systematically, especially in the context of problem solving; (2) the ability to communicate and collaborate (*Communication and Collaboration Skills*), able to communicate and collaborate effectively with various parties; (3) Ability to create and renew (*Creativity and Innovation Skills*), able to develop their creativity to produce various innovative breakthroughs; (4) *Information and Communications Technology Literacy*, able to utilize information and communication technology to improve performance and daily activities; (5) *Contextual Learning Skills*, able to learn contextual independent learning activities as part of personal development; (6) *Information and Media Literacy skills*, able to understand and use various communication media to convey various ideas and carry out collaborative

activities and interactions with various parties.

The Directorate General of PSMA (2017) states that 21st-century learning is learning that integrates ability literacy, skills knowledge, skills and attitude, and mastery of ICT. These skills can be developed through activity-based learning models that are in accordance with the characteristics of competencies and learning materials. One of the characteristics of the 2013 curriculum is that it must be able to direct students to understand their potential, interests, and talents in the context of career development, both at higher education levels and careers in higher education. public.

Aware of the high demands to create human resources who have 21st-century competency skills, the educational system and process must also undergo a transformation, and automatically the learning activities experienced by students provide opportunities for students. develop all potency which there is in herself so that the more increase good in the aspects of knowledge, skills, and attitudes. The skills needed in the 21st century are also higher-order *thinking skills (HOTS)* which are needed in preparing students to face challenges. global.

This higher-order thinking-based learning has the aim of developing critical and creative students. Therefore, educators have an important role to develop patterns in thinking critically, and creativity (Lie, et al. 2020). Skills think Critical thinking is one of the competencies that is often used to assess students but in reality, it is Skills think critical this not yet fully appear in process learning and students have not really been able to identify problems and answers, determine the basis for making decisions about reliable learning sources, draw conclusions from learning materials, provide more detailed explanations and can combine expert opinions with their own ideas. In accordance with the indicators of critical thinking skills, Ennis (2000) consists of 5 aspects of critical thinking skills, namely: *Elementary clarification* (providing a further explanation), *The basis for the decision* (determining the basis for decision making), *Inference* (drawing conclusions), *Advanced clarification* (providing a further explanation) and *Supposition and integration* (estimating and combine).

The lack of student interest in the learning process can also be caused by the conventional learning process or the methods used such as lectures, the process is one-way and only teacher-centered. Also, the teacher does not use learning models that make students active and do not bring up critical thinking skills. In line with observations in the field that researchers have done, there are still many obstacles to the use of learning models that are able to improve critical thinking skills and motivate students in learning.

Based on the results of observations made at SMAK WR Soepratman, SMAN 10 Samarinda, public high school 8 samarinda, public high school 3 samarinda and public high school 1 Samarinda by using *questionnaires* and interviews related to needs analysis which is the basis of this research. From the results of *questionnaires* and interviews with teachers in the five schools, the obstacles to using the learning model are still very visible This is because students are less active in asking questions, expressing opinions, and being difficult to organize following the directions of the syntax of the learning model used. In particular, the use of the *Problem-Based Learning (PBL) learning model* even though the teacher already knows and has used this model in learning but cannot be implemented properly due to obstacles from students, namely not all students can understand the material presented, readiness student in process learning, and obstacles from the teacher which limited by time. In contrast to the *Group Investigation (GI) learning model*, most of the observed teachers did not know and had never used this model in learning. Teachers who have used the *Group Investigation learning model*, also have obstacles in their application, namely, there are students who are not actively asking questions, working together in groups which is not enough good, and for a number of teacher models, this is also still considered difficult and complicated in its application to the process learning.

In addition to models, obstacles in learning are also very visible in critical thinking skills and motivation study students which very not enough seen from students. On Skills critical thinking is the

problem, students are lazy to read books, lack questions and exercises to develop skills to think critically student, are not brave convey an opinion, and need more time for students to solve problems from the material presented. While motivation has obstacles, namely students do not respond in the learning process, do not understand the material, students are not enthusiastic when starting lessons, and lack focus when the learning process is in progress. take place.

However, judging from the results of student observations, the reality is that the learning process is more teacher-centered and does not provide opportunities for students to convey the ideas or ideas they think. Most students also stated that biological material was difficult to understand when the learning process only used the lecture method. Students are happier when biology material is presented with different models with varied learning resources. From the results of observations using questionnaires and interviews conducted with teachers and students could be understood that model learning should be applied in the learning process so that students can think critically and are motivated to understand the biology material being studied take place.

Based on the description above, the researcher aims to try to use innovative, problem-based learning models around students in accordance with real problems in the student environment, help students improve their critical thinking skills, motivate students to learn more, and make students more active in the learning process. Researchers are interested in doing a study with the title "Influence Model Learning *Problem-based Learning* and *Group Investigation* of Critical Thinking Skills and Learning Motivation in Learning Biology Student Class XII SENIOR HIGH SCHOOL Catholic WR Soepratman No. 020 Samarinda". In this study, researchers wanted to see whether the use of *Problem-Based Learning* and *Group Investigation learning models* affected the results of critical thinking skills and could affect learning motivation. student.

METHOD

This study used a quasi-experimental method, namely the experimental group and the control group. This quasi-experimental research uses a design study *pretest-posttest control group design* (Sugiyono, 2016). Selection of research subjects by purposive sampling. Learning Models used in groups experiment are model *Problem-Based Learning (PBL)*, model *Group Investigation*, and for the control group (without learning models or conventional learning, which is what is usually done by teacher).

Group	Pretest	Treatment Questionnaire	Posttest
R ₁	Q1 ₋	X ₁ Y ₁	Q2 ₋
R ₂	Q1 ₋	X ₂ Y ₁	Q2 ₋
R ₃	Q1 ₋	X ₃ Y ₁	Q2 ₋

Information:

R₁ : Experimental group I

R₂ : Experimental group II

R₃ : Control group

Q₁ : Pretest Q₂ : Posttest

X₁ : Learning treatment using the *Problem-Based Learning model*

X₂ : Treatment of learning using the *Group Investigation model*

X₃ : Without the treatment of learning models/conventional models

Y₁ : Learning Motivation Questionnaire

The instruments of this research are a survey and *test (pretest and posttest)*. Data analysis used the prerequisite test for normality test, homogeneity test, followed by One Way Anova test then further test using *Post Hoc Least Significance Difference (LSD)*

DISCUSSION

Table 1. Normality Test Results for Critical Thinking Skills

Critical Thinking Skill			
No	Model	Result	Information
1	Problem Based Learning	0.20	Normal
2	Group Investigation	0.99	Normal
3	Conventional	0.20	Normal

The results of the normality test in the three classes using 2 treatment models and conventional 1, namely class XII IPA 1 using the *Problem-Based Learning learning model*, class XII IPA 2 using the *Group Investigation learning model*, and class XII IPS 1 using conventional learning with normal distribution. The values of each model with a significance of 0.05 are: Sig_{PBL} = 0.200 > = 0.05, Sig_{GI} = 0.099 > = 0.05, and Sig_{Conventional} = 0.200 > = 0.05 then the critical thinking data in the three classes is distributed normal.

Table 2. Results of Homogeneity Test of Thinking Skills Critical

Critical Thinking Skill			
No	Model	Result	Information
1	Problem Based Learning		
2	Group Investigation	0.631	Homogeneous
3	Conventional		

From the results of the homogeneity test of the three classes used in the study, the analysis obtained is Sig = 0.631 > = 0.05, it can be concluded that the data comes from a population with the same variance (homogeneous).

Table 3. Normality Test Results of Students' Learning Motivation

Motivation			
No	Model	Result	Information
1	Problem Based Learning	0.20	Normal
2	Group Investigation	0.20	Normal
3	Conventional	0.20	Normal

The results of the normality test in the three classes using 2 treatment models and conventional 1, namely class XII IPA 1 using the *Problem-Based Learning learning model*, class XII IPA 2 using the *Group Investigation learning model*, and class XII IPS 1 using conventional learning with normal distribution. The value of each model with significance 0.05 that is: Sig_{PBL} = 0.20) > = 0.05, Sig_{GI} = 0.20 > = 0.05, and Sig_{Conventional} = 0.20 > = 0.05 then the data on student learning motivation in the three classes is normally distributed. Table 4. Results of Homogeneity Test of Students' Learning Motivation

Motivation			
No	Model	Result	Information
1	Problem Based Learning		
2	Group Investigation	0.74	Homogeneous
3	Conventional		

From the results of the homogeneity test of the three classes used in the study, it was found that the analysis was Sig = 0.074 > = 0.05, it can be concluded that the data came from populations with the same variance (homogeneous).

Table 5. One Way Anova Test Results for Critical Thinking Skills

Critical Thinking Skill			
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No	Model	Result	Information
1	Problem Based Learning		
2	Group Investigation	0.00	There is Influence
3	Conventional		

Based on the table on which is results testing statistics could is known that f calculate critical thinking skills with a significant value of critical thinking skills less than 0.05 or 5% ($0.00 < 0.05$), it can be concluded that in this study there is an influence Skills think critical Among model learning *Problem-Based learning, Group Investigation* learning model and conventional learning have an effect on students' critical thinking skills. Then proceed with the *Post-test Hoc*.

Table 6. ANOVA One Way Test Results Student Learning Motivation

Motivation			
No	Model	Result	Information
1	Problem Based Learning	0.00	There is Influence
2	Group Investigation		
3	Conventional		

Based on the table above which is the result of statistical testing, it can be seen that the significant value of student learning motivation is less than 0.05 or 5% ($0.00 < 0.05$) so it can be concluded that in this study there is an influence of student learning motivation between learning models *Problem -Based Learning, Group Investigation* learning model and conventional learning have an effect on students' learning motivation. Then proceed with the *Post Hoc test*.

Table 7. Results of *Post Hoc Test* of Critical Thinking Skills

Critical Thinking Skill			
No	Model	Result	Information
1	Problem Based Learning and Group Investigation	0.039	PBL > GI
2	Problem Based Learning and Conventional	0.000	PBL > Conventional
3	Group Investigation and Conventional	0.015	GI > Conventional

Based on the table above, the sig value between *PBL* and *GI* is $0.039 < 0.05$, this shows that there is a difference in skills think critical Among *PBL* with *GI* and mean value deferens as big as 5.64 which means average mark Skills think critical *PBL* higher than the *GI* so it can be said that *PBL* is more effective than with *GIs*.

The sig value between *PBL* and conventional is $0.000 < 0.05$, this indicates that there is a difference in critical thinking skills between *PBL* and conventional and the mean reference value is 12.02, which means the average value of *PBL critical thinking skills* is higher than conventional so that it can It is said that *PBL* is more effective than Conventional.

The sig value between *GI* and Conventional is $0.015 < 0.05$, this indicates that there is a difference in critical thinking skills between *GI* and Conventional and the mean reference value is 6.37, which means the average value of *GI critical thinking skills* is higher than conventional so that it can it is said that *GI* is more effective than Conventional.

Based on table 7. it can be concluded that the *PBL model is the* most effective for improving students' critical thinking skills.

Table 8. Results of the *Post Hoc Test* of Students' Learning Motivation

Motivation			
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No	Model	Result	Information
1	Problem Based Learning and Group Investigation	0.046	PBL > GI
2	Problem Based Learning and Conventional	0.000	PBL > Conventional
3	Group Investigation and Conventional	0.026	GI > Conventional

Based on the table above, the sig value between *PBL* and *GI* is $0.046 < 0.05$, this shows that there is a difference in motivation Between *PBL* with *GI* and marks a mean difference of 5.60 which means that the average value of *PBL motivation* is higher than the *GI*, so it can be said that *PBL* is more effective than *GI*.

The sig value between *PBL* and conventional is $0.000 < 0.05$, this indicates that there is a difference in motivation between *PBL* and conventional and the mean reference value is 11.59 which means that the average value of *PBL motivation* is higher than conventional so it can be said that *PBL* is more effective compared to Conventional

The sig value between *GI* and Conventional is $0.026 < 0.05$. This indicates that there is a difference in motivation between *GI* and Conventional and the mean reference value is 5.99, which means that the average value of *GI motivation* is higher than conventional, so it can be said that *GI* is higher. effective compared to conventional.

Based on table 8. it can be concluded that the *PBL model is the most effective for increasing student motivation.*

Discussion of research results which include:

1. Problem-Based Learning (PBL), Group Investigation (GI), and Conventional Learning Models on Critical Thinking Skills Student

Based on the results of the study, there is a significant influence between learning models on students' critical thinking skills as a significant value of $0.00 < 0.05$, this value means that conclusively the independent variables (*Problem-Based learning model, Group Investigation, conventional learning*) in this study together -the same effect on critical thinking skills.

Problem-Based Learning model learning, students gain important knowledge that makes them proficient in problem-solving, have the skills to participate in teams, and can develop independent learning and social skills of students. The *Problem-Based Learning* learning model is not designed for teachers to provide as much information as possible to students in the learning process. The *Problem-Based Learning* Model was developed to help students develop thinking skills, problem-solving, and involvement in real experiences to become independent learners.

In model learning, this learner was placed as the focus main in learning activities to encourage students to be more creative in solving problems that he faced. Problems that arise are related to Theory which is taught with life daily participant education. Besides that, the teacher as a guide or facilitator in learning is fully responsible for identifying learning objectives, material structures, and basic skills to be taught. Then help students to solve problems in the implementation and application of the *Problem-Based Learning model*. This knowledge can improve the critical thinking skills of students.

This supports the results of previous research conducted by Syahroni Ejin (2016) which concluded that science learning tools based on the *Problem-Based Learning (PBL)* learning model can increase student activity, student responses to process learning give a response positive, the whole student achieves complete mastery of concepts and critical thinking skills. In learning the *PBL model* students are faced with real-life problems from the environment so that they can

improve their performance by understanding draft and thinking critically student. Learning model *PBL* and *GI* both improve critical thinking skills but learning the *PBL model* is significantly better. Overall the results of the responses given by students are positive towards the learning model *PBL*.

In the learning process with the *Group Investigation model*, students are encouraged to improve their communication and collaboration skills of each student, increase student participation in the learning process, students' understanding of material becomes deeper because students are involved from the beginning of learning, and students are trained to work independently. systematic. These activities will train and improve students' critical thinking skills.

The study support is Fitrianiingsih (2016), who concludes that *GI (Group Investigation)* learning model can be alternative learning that encourages students to be more active, cooperate with each other, interacts, train communication skills, and be able to improve critical thinking skills in applying their knowledge in solving a problem. In line with the opinion of Zahratul (2018) who suggests that the *Group Investigation type cooperative learning* model is a learning model that encourages students to think in teams by critical, creative, and analytical. Skills this makes the student Becomes easier to master the current learning material he studied.

Based on the results of the *LSD further test of the PBL learning model*, the *GI model* and learning Conventional there is influence on Skills think critical student but of the three learnings applied by the *PBL model*, it is a model that has a major influence on improving students' critical thinking skills. From the results of the analysis of the *LSD further test* for the *Problem-Based Learning model of the group investigation* learning model, sig. $0.039 < 0.05$ which means significantly different, this explains that the used model *PBL* more influences Skills think students' criticality compared to the *GI model*. For the *Problem-Based Learning model* of conventional learning, it looks very different from sig. $0.000 < 0.05$, meaning that the *PBL learning model* and conventional learning have different effects on students' critical thinking skills. The *GI learning model* against the *conventional learning model* has significantly different results from sig. $0.015 < 0.05$ which means that the *GI learning model* and conventional learning have different effects on improving the critical thinking skills of the student.

The difference in the increase in the value of Critical Thinking Skills with the class results that use model *PBL* taller compared to the class which uses model *GI* can be due to several reasons, namely: for *PBL classes* students only focus on the process solve the problem which given by teacher and happening process ask answer which is active between teachers and students as well as students and teachers, so that students are accustomed to higher-level thinking tall specifically think critical. The focus model *Problem-Based Learning (PBL)* is more focused on what which students think (their cognition), not on what students do (behavior) during their process of working on it. Although the teacher's role in problem-based learning sometimes also involves presenting and explaining various Things to the student, the teacher more often enables himself only as a guide or facilitator so that students can learn to think and solve their own problems.

Sudarman (2007) adds that the *Problem-Based Learning model* is an approach that uses problems from the real world as a context for students to learn about critical thinking and problem-solving skills, as well as to gain knowledge from the subject matter. Problem-oriented learning is designed to develop higher-order thinking skills in problem-oriented situations.

The *Group Investigation (GI) model* itself focuses on student activities to find their own learning material to be studied. In its implementation, the *GI Model* is usually divided into groups of 5-6 students with heterogeneous characteristics. A distribution group is based on the consideration of common interest in a particular topic. Students choose a topic they want to study, then conduct an in-depth investigation of the selected subtopic, then prepare and prepare to serve something report to be presented. Learning on the class *GI*, students sued to look for problems alone and solve the problem themselves, and during the learning process even though students are active, the

answers given by students have not shown the direction of thinking critically.

The implementation stage shows that this model is too difficult to implement because students have to play an active role in finding existing materials and problems to solve through ingredients that there are around. The thing this results in, only on a student who own will and feel capable for could finish Duty, temporary the other students just wait. This problem is in line with the weakness of the *Group Investigation* model itself, namely this model is a complex model and takes time which is long in implementation. Implementation even only involves students which already own initiative and ability previously. The success model, also depends on the ability of students to organize their groups to work independently.

2. *Problem-Based Learning (PBL), Group Investigation (GI), and Conventional Learning Models on Learning Motivation Student*

In this study, there is a significant effect between the learning model on students' learning motivation as the value of sig. $0.00 < 0.05$, this value means conclusively that variables free on study this by together influential on the dependent variable (Learning Motivation Student).

In the LSD further test for the *Problem-Based Learning* model of the *Group Investigation learning model*, the results obtained are sig. $0.046 < 0.05$ which means between the two models are significantly different, the *Problem-Based Learning* and *Group Investigation learning models* have an unequal effect on increasing students' learning motivation. In fact, the results obtained by the *Problem-Based Learning model* are better able to increase students' learning motivation compared to the *Group Investigation model*. For the *Problem-Based Learning model of the conventional learning model*, the results obtained are sig. $0.000 < 0.05$ and the *Group Investigation learning model* of $0.026 < 0.05$, meaning that the learning models are significantly different or significantly different. *Problem-Based Learning* and *Group Investigation learning models* are able to increase students' learning motivation compared to conventional learning that is usually used by teachers in the classroom. One of the learning models which facilitate happening to learn contextual in school or outside is the *Problem-Based Learning model*. Dewi, Sadia, and Suma (2014) explain that Thing this in accordance with hope from the process implementation model of *PBL learning* where students don't just listen, take notes and then memorize the material given by the teacher, but with the implementation of the *PBL learning model*, it makes the student more active in process learning. The existence influence model *PBL learning* on student motivation is based on the characteristics of the problem-oriented *PBL model* to stimulate, contextualize and integrate learning (Newman, 2005). In accordance with the research conducted by Kusnandar (2019), the *PBL model* can be used to increase student motivation. He also explained that motivation is able to move students to be more enthusiastic in accepting learning. Could be concluded that model learning *Problem-Based Learning* can increase the learning motivation of students.

Likewise, research conducted by Widiarsa (2014) concluded that students' learning motivation who studied with the *Group Investigation type of cooperative learning model* was better than students who studied with conventional learning models. Supported Budiani's research (2014) stated that the increase in student motivation scores was due to the application of the type cooperative learning model *Group Investigation* there are stages which could grow motivation student learning. However, student motivation is also seen from the internal factors of each student. High motivation will make students have a strong determination to learn and be ready to face all the difficulties that will arise in student learning activities. Here students feel challenged to complete all the tasks given by the teacher and have confidence in the results obtained. So that in the end students always try to find new materials and sources related to history. Besides that students whose own motivation which tall own flavor want to know which tall Thing This can be seen in the efforts they make and always pay attention to the teacher's explanations and always ask if there are things that are still unclear or feel different from their thoughts. Students who have low

motivation, see it as easy in terms of learning, so it does not create curiosity in their minds. In the end, the students did not have enthusiasm in following the lesson and showed an indifferent attitude towards the lesson. When required to complete a task, the student tends to have difficulty and feel lazy in completing it. This in turn has an impact on students' self-confidence to express opinions and ideas that are in their minds and make students passive in the learning process.

The *Problem-Based Learning* and *Group Investigation learning model* as a whole is student-centered learning, where throughout the learning process students are involved in the process of critical thinking skills and student motivation. This is what causes students to have better learning motivation than students student which process the learning using model learning *conventionally*. Conventional models are one-way or centered on teachers.

CONCLUSION

Based on the results of research and discussion, it can be concluded as follows:

Exist the influence of the learning model *Problem-Based Learning* on critical thinking skills of class XII students of WR Soepratman Catholic High School No. 020 Samarinda.

Exist the influence of the *Group Investigation* learning model on the critical thinking skills of class XII students of WR Soepratman Catholic High School No. 020 Samarinda.

Exist the effect of the *Problem-Based Learning* model on the learning motivation of class XII students at WR Soepratman Catholic High School No. 020 Samarinda.

Exist the influence of the *Group Investigation learning model* on the learning motivation of class XII students at WR Soepratman Catholic High School No. 020 Samarinda.

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