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Student Tutoring, Facilitator and Explaining Models: A Problem Solving Metacognition towards Learning Achievements of Informatics Students

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ABSTRACT

Metacognition problem solving learning model applied through student tutoring, facilitator, and explaining predicted were able to overcome the low learning achievement of students. The purpose of this research is to know the problem-solving metacognition with learning models of student tutoring, facilitator, and explaining and to find out problem-solving metacognition with learning model of student tutoring, facilitator, and explaining to the students the learning achievements of informatics. This research is descriptive qualitative study uses a quasi-experiment method. Data analysis using independent-test and ANOVA. The results showed that students' problem-solving metacognition is at a low category percentage of 35,005%. Problem-solving metacognition of the students with student tutoring, facilitator, and explaining the learning model has no effect against the learning achievements of students of Informatics with F of 0.03 and significant of 0.874.

1. Introduction

Metacognition consists of self-regulation, a reflection against yourself about the advantages, disadvantages, and learning strategies. Metacognition can be used to monitor the extent to which the cognising ability to understand an issue. The context and process of learning by involving the presence of metacognition, so students can learn how to learn, knowing the capabilities and modalities of learning owned and know the best learning strategies to learn effectively (Zulirfan et al., 2018). Some researchers have shown that metacognition plays an essential role in problem solving as well as in the acquisition and application of skills

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acquired in the various fields of the discovery of the skeleton of the mathematical thinking well structured. The difficulty of students in mathematical problem solving is caused by the questions given are not present in the previous simple and easy questions the students are accustomed to (Heleni et al., 2018). In addition, according to the (Santosa et al., 2013) practicing solve math problems are early in the efforts helped overcome the difficulties students in solve math problems.

In line with these conditions, it can apply to learn that familiarises students working together, helping each other in knowledge and understanding the matter through cooperative learning. Cooperative learning predicted were able to overcome the low learning achievement of college students. According to (Suryani, 2019) Cooperative learning is a group of teaching strategies that involve students working collaboratively to achieve common goals.

Resumes from various research results about implementing cooperative learning 101 reasons, among them that collaborative learning can improve the students in terms of (1) thinking and study science; (2) learning environment in science; (3) the attitude of science to-had; (4) the achievement and assessment of science science learning;(5); (6) the ability to read and write Science;(7) social skills; (8) science can be applied in real life; (9) supports both male students as well as women performed by (Lord, 2001). One type of cooperative learning, i.e. student facilitator and explaining (SFAE). The SFAE is one type of collaborative learning, which stresses on a structure specially designed to influence patterns of interaction of learners and have a goal to enhance the mastery of the material (Shohimin, 2014). Student facilitator and teaching material presentation were explaining that begins with an explanation publicly, provided an opportunity to demonstrate the student back to his colleagues, and ends with the delivery of all materials to all students (Huda, 2013).

Student facilitator and explaining model are learning where students or learners learning presented the ideas or opinions on other fellow learners (Aqib, 2014). Student facilitator and explaining is a model where students show their thoughts or views on other students according to (Lei, 2004). Student facilitator and explaining the model has the meaning which makes the students can create a concept map or chart to improve the creativity of students and the learning achievements of students (Suprijono, 2009). For cooperative learning, methods have been implemented earlier in which each student is working together to resolve the issue that is given but still not optimal. Therefore it needs to be done the modification by combining student facilitator and explaining and Peer Tutoring (Miguel et al., 2017). Study on modified SFAE with peer tutoring, teaching material presentation preceded explanations open by one person as a student tutor to his colleagues, learning evaluation form given the end of the quiz (Jan et al., 2017; Alan et al., 2017)

Based on observations metacognition ability of informatics student IA Pagi use cognitive aspects only. Apparent from the planning by students, self-regulation, and reflection when the learning process has not yet enacted to the maximum and any assessment instruments Metacognition has again used for learning. This

condition makes us not knowing the student has or has not had the metacognition. Most students are less able to manage the material well because a lot of the stuff obtained so that they are difficult to remember the thing well.

On the learning process of the students focus solely on the material studied without concluded that had he had learned and less able to manage time well in achieving the learning objectives. As a result, when students faced with a problem, a student of difficulty to break it. Solving problems is a form of critical thinking according to (Paidi, 2007). According to Quelmalz (in Yennita et al.,, 2018) higher order thinking skills are five forms of reasoning: Recall, analysis, comparison inference and evaluation. The ability to do problem-solving not only related to the appropriateness of the solutions obtained, but rather the ability shown since recognising the problem, find the solution alternatives, choosing one of the other options as solutions, as well as evaluating the answers that have obtained.

Based on observation, mathematical problem solving performance of students is still very lacking. The evaluation of the early material in mind shows that the average student is still not able to relate the issues in the context of events in real life, not being able to make use of data/information on the matter, the inability to translate problem into the form of mathematics, and a lack of understanding of the problem. Based on the things that were put forth above, student tutoring, facilitator, and explaining the achievements expected to increase student learning and problem solving metacognition of college students with student tutoring, facilitator, and explaining give influence on the result of student learning. Therefore, this research is fundamental because it aims to provide the learning achievements of students against the impact of Informatics also able to know and improve students' problem solving metacognition with a combination of peer learning model tutoring and student tutoring.

It bases on observations in this study the problem then is how to model problem solving Metacognition of learning student tutoring, facilitator, and explaining and do problem solving Metacognition model learning student tutoring, facilitator and explaining to the students the learning achievements of informatics. In line with the formulation of the problem, then the purpose of this research is to know the problem solving Metacognition model student tutoring, learning facilitator, and explaining and to know the influence of Metacognition problem solving model student tutoring, learning facilitator, and the learning achievements of students towards teaching informatics.

2. Methodology

This research is descriptive research analytical method using a quasi-experimental design. The population in this research is a student of Informatics in semester four that add up to 80 people. Sampling techniques in the study using purposive sampling. The research sample is determined through consideration of the researchers because the goal of this research is to know the ability of metacognition

students use problem-solving assessment service so that the examples are expected to practice sheets This problem solving activities so that the retrieved data is accurate. Based on the technique of sampling taken IB classes because the average students have good cooperation in groups. The variable in this study is independent variables which consist of problem solving metacognition with the learning model of student tutoring, facilitator, and explaining, a variable is the learning achievements of students.

The data collected now consists of student metacognition theory of metacognition strategies drafted Flavel and Brown (Flavell et al., 1977) and tests the results of the study containing indicators of problem solving that understand the problem, make a plan/strategy settlement, answer and interpret the returned responses to the conclusion. Data obtained through various instruments analysed qualitatively and quantitatively. Datasheet results from the validation of the model of teaching and learning device that investigated quantitatively, narrative techniques are then used to draw qualitative conclusions. Student learning outcomes saw with administering tests that meet the indicators of problem solving data from the student learning outcomes analysed in the form of an average value per class meeting data obtained from the test results of the study investigated by using the rubric scoring or weighting score.

The descriptive analysis techniques also have done inferential analysis techniques, engineering analysis of the inferential in this study using Independent t-test and Analysis of Variance (Anova). Independent t-test was done to test data generated from problem solving metacognition with the learning model of student tutoring, facilitator, and explaining. Anova test was used to test the resulting data from the troubleshooting of metacognition with student tutoring, facilitator, and describing the learning achievements of students and at the same time. Before checking the independent t-test and ANOVA test done first, pre-conditions, namely the analysis of its homogeneity and normality test. Its homogeneity and normality test used to determine whether data from each variable is Gaussian and homogeneous or not. The data to be tested for normality and homogeneity is problem solving Metacognition with student tutoring, facilitator, and explaining the learning achievements of students and then check the independent t-test to find out the effect on the variables are bound. They are testing conduct on a 5% significance level.

3. Results and Discussion

Preliminary analysis

Table 1 shows the syntax model of student tutoring, learning facilitator, and explaining. The syntax of the model is an important thing in the research. The syntax was used as the guide for the lecturer and students as well for conducting the learning. The syntax consists of the stage learning wick is in the coloumn, the main syntax is mentioned, and followed by the syntax for the lecturer. The student activities are given in the third coloumn which the activities will be following the lecturer activities (Table 1).

Table 1. The syntax of Student Tutoring Learning, Facilitator, and Explaining

Stages Learning	Lecturer Activities	Student Activities
The Division of a study group	The lecturer was drawing up study groups, each group-membered 3-4 people who have different ability. Each group has at least one person learners who can become friends of the associate tutor.	Students sit on their study group
Presentation of Lecturer	The lecturer explains how the completion of tasks through learning groups with peer teaching method, the authority and responsibilities of each member of the group, and described the mechanism of assessment tasks through peer and self-assessment. The lecturer pointed to appoint tutors from each group to explain to the other attendees either through the chart/map concept as well as the other. It does in turns.	Students listen to the lecturer explanation The role of the student who became a tutor in each group
Group Discussions	The lecturer gives the task with a note that difficulty in learners the work may require guidance to a friend who appointed as a tutor. Lecturer observe learning activities and provide an assessment of competence	Students complete the tasks provided with the aid of the tutor. Students fill out the question form metacognition troubleshooting based on the given task.
Summary of material	The lecturer concluded the article presented at that time.	Students follow the delivery of the material presented.
Evaluation	Lecturers provide teaching and learning assessment to establish the follow-up activities to the next round.	Lecturers provide teaching and learning evaluation to establish the follow-up activities to the next round.

Preliminary analysis was identifying problem solving metacognition of Informatics students in Sekolah Tinggi Teknologi Dumai. The data results of the student problem solving metacognition question form can see in Table 2.

Table 2 shows in descriptive that students have been able to understand the way of thinking, conscious as a thinker and can distinguish between input and output of the elaboration process of thought, can regulate the process of reflection and independent study as well as being able to determine the problem, have a plan of the settlement and get a resolution. Overall the common student problem solving metacognition abilities are at a low category with number 35,0 %.

Based on tests of problem solving have completed by students. There are several students that have to understand reserved well but still some problem-solving strategies to use with the menu so that the answer to question list. This condition can see in Table 3 of the distribution of the results of the tests the ability of problem solving metacognition. Overall in the Table 3, Average metacognition

ability of students is low. This is indicating that almost the student ability is more or less similar.

Table 2. The Results of the Student Problem Solving Metacognition Question Form

No	Indicator	Score	Average
1	In its Discrete Mathematics Learning, I set a goal to achieve when starting to learn a new chapter.	30	85.7
2	In its Discrete Mathematics Learning, I recall whatever material studied previously associated with the content to study	27	77.1
3	To get a good understanding, I determine how to learn which ones suit me.	24	68.6
4	I've learned and have had early knowledge about the material before doing activities on troubleshooting the problem	30	85.7
5	I need to know about the concepts related to the material presented before doing the activities solving problems on a reserved	27	77.1
6	I think steps/strategies to solve the problem in a matter to finish it on time	30	85.7
7	I am sure you understand the question	26	74.3
Sum		194	554.2
Average		35.0	
Category		Low	
The decision		Started To Develop	

Table 3. Test Results-Solving Metacognition Ability of Students

No	Problem Solving Metacognition Ability Indicator	Score	Percentage (%)	Category
1	Understand the problem	36	54.55	Sufficient
2	Devise a plan	36	54.55	Sufficient
3	Carry out the plan	6	9.09	Very Low
4	Interpretation of the Result	12	18.18	Very Low
Sum		90	136.37	
Average		34.09		Low

Analysis of Requirements Test

This test uses a few tools test, normality test, linearity test and homogeneity test. Test of normality is done using the technique of One-Sample Kolmogorov-Smirnov which compare the test results with particular significance level KS (0.05). Data normality test results for both variables are the following research results of test calculations data normality, the score variable X obtained $KS = 0.238 > 0.05$. These results indicate that the score students with problem solving metacognition student tutoring, facilitator, and explaining normal distribution. The results of the calculation of test score data, the normality of variables Y obtained $KS = 0.278 > 0.05$. These results indicate that students' learning

achievement score Informatics was frequently distribution. For its homogeneity test done using Residuals Versus Fits. On a Plot of Versus Fits can be concluded that the error variance homogeneity because its data spread to normal. Testing normality, its uniformity and linearity, shown in Figure 1.

Based on a statistical analysis of the regression between the student's problem solving metacognition with student tutoring, facilitator, and student learning achievements by explaining Informatics obtained regression equation, i.e. $Y = 0.22446.84X$. The t-value calculation based on the count of 0.16, while p-value of 0.874, so the value of the p-value $> 5\%$, meaning that there is no significant problem solving metacognition influence students with student tutoring, facilitator, and explaining towards achievement Informatics students learning. The coefficient of determination R^2 of 0.3 which means the learning achievements can explain 30% variation on the problem solving Metacognition students with student tutoring, facilitator, and interpreting while 70% influenced by variables that did not describe in the model.

The results showed that the overall activity of the student is not sufficient. The dominance of lecturers in the learning process is very instrumental. It can say that the student category of Informatics prefers traditional learning that can provide activities that help students to arouse the curiosity of the year and express the idea or the idea of their natural Moreover teachers can monitor whether students' thinking processes and the knowledge of students is sufficient to resolve and troubleshoot problems encountered.

Student tutoring learning model, facilitator, and explaining should be able to make students master the material, forming cooperation among group members, actualise its ability in delivering content, hear and answer arguments questions so that students can demonstrate the potential. But the habits of students waiting for an explanation from the lecturer made the students of the Informatics do not own these activities. More students rely on to tutor the student capable of so low is not active; the cooperation between members of the group become less as well as independently is not done correctly. With the meaning of the word problem solving Metacognition Informatics students learning with student tutoring, facilitator, and explaining does not affect the learning achievements of students of informatics. The student should learn actively with concepts and principles so that they can gain experience doing experiments that allow them to find their ideas. Students are expected to get used to working together, helping each other in learning and understanding the material that can be optimised as well as apply in the matter presented course with the appropriate learning model with the average academic ability of students in general.

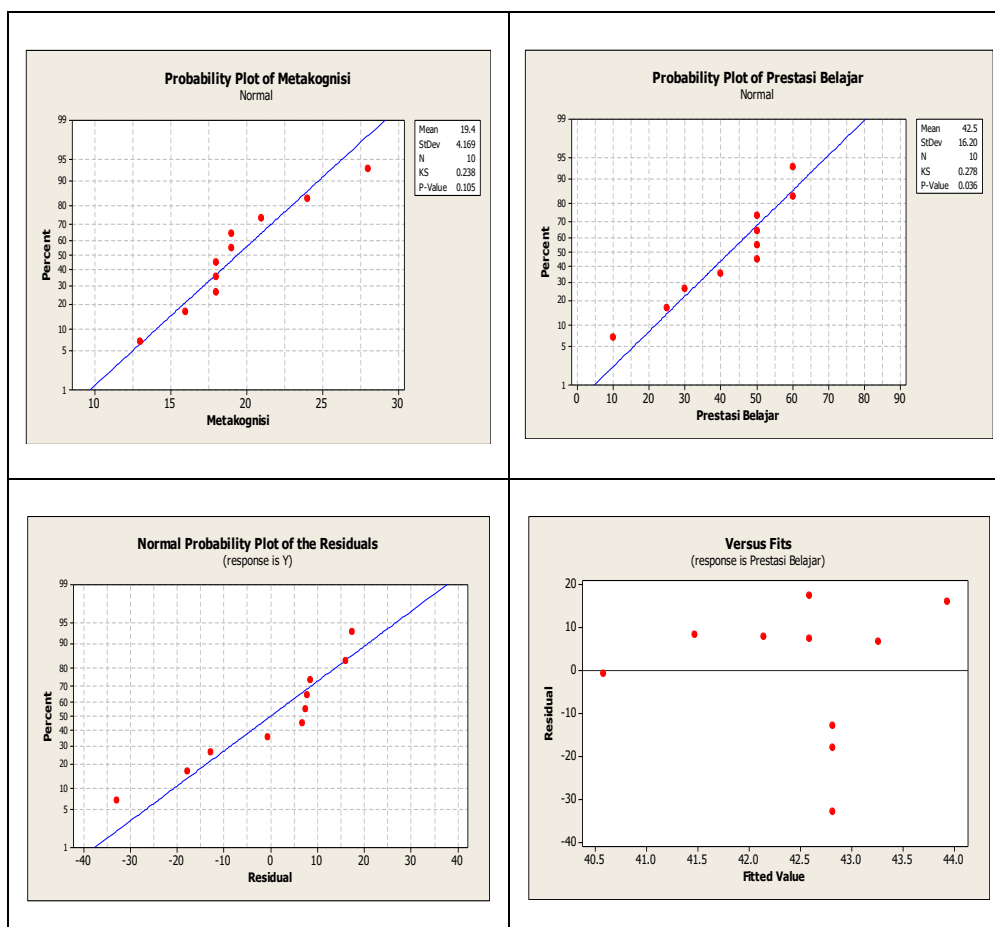


Figure 1. Test of Normality, Linearity, and Homogeneity

4. Conclusion

The research shows that through the preliminary analysis by using problem solving metacognition ability, it now can be concluded that the strength of the student problem solving metacognition has a low ability to any indicator of problem-solving ability. The value means that there is no significant problem solving metacognition influence students with student tutoring, facilitator, and explaining the learning achievements against Informatics students. With the meaning of the word problem solving Metacognition Informatics students learning with student tutoring, facilitator, and explaining does not affect the learning achievements of students of informatics. The result may affecting by the real condition of student ability for certain condition.

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