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4th ICEL 2016

THE FOURTH INTERNATIONAL CONFERENCE ON EDUCATION AND LANGUAGE

20-21 May 2016
Bandar Lampung University, Indonesia

PROCEEDINGS

THE FOURTH INTERNATIONAL CONFERENCE ON EDUCATION AND LANGUAGE

4th ICEL 2016

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PREFACE

The activities of the International Conference are in line and very appropriate with the vision and mission of Bandar Lampung University (UBL) to promote training and education as well as research in these areas.

On behalf of the Fourth International Conference of Education and Language (4th ICEL 2016) organizing committee, we are very pleased with the very good responses especially from the keynote speakers and from the participants. It is noteworthy to point out that about 80 technical papers were received for this conference

The participants of the conference come from many well known universities, among others: International Islamic University Malaysia (IIUM), Malaysia, Hongkong Polytechnic University, Hongkong, Shanghai Jiao Tong University (SJTU), China, Shinawatra Univesity, Thailand, University of Texas, Austin, USA, University Phitsanulok Thailand, STIBA Bumigora Mataram, Universitas Ahmad Dahlan, STKIP-PGRI Lubuklinggau, Indonesia University of Education (UPI), Universitas Sanata Dharma, State Islamic College (STAIN) of Jurai Siwo Metro Lampung, State University of Sultan Ageng Tirtayasa and Universitas Lampung.

I would like to express my deepest gratitude to the International Advisory Board members, sponsors and also to all keynote speakers and all participants. I am also grateful to all organizing committee and all of the reviewers who contribute to the high standard of the conference. Also I would like to express my deepest gratitude to the Rector of Bandar Lampung University (UBL) who gives us endless support to these activities, so that the conference can be administrated on time.

Bandar Lampung, 20 May 2016

Drs. Harpain, M.A.T., M.M
4th lCEL 2016 Chairman

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Education and Language (4th ICEL 2016)
BANDAR LAMPUNG UNIVERSITY
Bandar Lampung, Indonesia
May 20,21 2016

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THE APPLICATION OF PROBLEM BASED LEARNING TO INCREASE CRITICAL THINKING AND METACOGNITIVE GRADE XII STUDENTS AT SENIOR HIGH SCHOOL (SMA) "XYZ" MAKASAR

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Abstract

Traditional learning, where a teacher teaches in a classroom and the students only listen, has several weaknesses. Some of the weaknesses are students have the tendency to be passive and less critical in the process of teaching and learning. The objective of this research is to analyze the effect of applying the problem based learning to students' critical thinking and metacognitive. This research was conducted using quantitative approach and experiment method. The subjects of this research were 28 grade XII students at High School "XYZ" Makassar. The results of this study show that the problem based learning method is able to increase students' critical thinking and metacognitive abilities.

Keywords: problem based learning, perception, critical thinking, metacognitive skill

1. INTRODUCTION

Nowadays, learning methods used in the classroom have developed a lot, from traditional to modern. It is driven by a number of weaknesses that are found in the traditional learning methods, including less encouraging students to think critically and actively during the learning process. It led to the birth of modern learning methods which are expected to meet the students' learning needs which are not found in traditional learning models. One of the modern teaching methods which can accommodate the weaknesses of the traditional method is problem-based learning. This method was developed to respond the development of the scientific world that rose in the 20th century, which at that time began to question the effectiveness of traditional learning methods[1]. This method is designed with a contextual learning approach linking academic content to the context of daily life[2]. This method will encourage the students to understand the concept of lessons based on the correct theory then blasted with a problem, so that students are encouraged to think critically, assess what happened, what went wrong, how that should (concept of truth) be done and then create a solution based on their capabilities. One of the disciplines that require a contextual learning approach is Economics. The basic reason is human do economic activities every day ranging from the simple to the complex.

2. LITERATURE REVIEW

This research was grounded on theories of problem based learning, critical thinking perception and metacognitive skills.

2.1 Problem-based learning

Teo[3] states that the problem based learning (PBL) is an approach to teach and organize students' learning. They also emphasized that students need to do the same activities as in the real world while learning. Something similar is described by Barrows[4] which explains that the method of problem-based learning will encourage students to be present at the activity as valuable at the time of study and in the real world. That is why problem based learning method could present a contextual learning. Another expert named Majid[5] explains that problem solving method is about how to give sense to stimulate the students to pay attention, study and think about an issue then analyze the issue in an attempt to solve the problem. Another definition proposed by Suardi[6] which says that the method of problem-based learning is a learning approach that confronts students with practical problems, in the form of ill-structured or open-ended through a learning stimulus. Stages in problem based learning include[7]: (1) find a problem in the article, (2) collect information related to the problems found, (3) analyze the information that has been obtained on the basis of learning resources, (4) making the solution that can be reached, (5) make conclusions.

2.2 Perception

Kalat[8] simply says that perception is the interpretation of the information obtained from the environment. Something similar was stated by Plotnik[9] which explains that perception is the experience that we had after our brains assemble and combine thousands of individuals and sensation into meaningful patterns or images. However, our perceptions rarely become an exact replica of the original stimulus. Instead, our perceptions are usually changed, biased, colored, or distorted by a unique experience. Thus, perception is our personal interpretation of the real world. Furthermore, Lahey[10] explains that perception is a sensation that is transmitted to the brain in the form of nervous energy that must be governed by and construed or interpreted.

This study uses the word perception to assess the variable critical thinking in learning. Related to learning, perception refers to the changes in the brain that change how we process sensory information[11] Based on the definition of the perception described above, it was concluded that the perception of critical thinking in this study was obtained from the interpretation of the students' thinking process based on information obtained from the critical thinking process after they do learning activities with problem based learning method.

2.3 Critical Thinking

Inch and Warnick[12] states that critical thinking is a process which the scientific method applied by ordinary people for ordinary world. It requires the ability to analyze and evaluate the conclusions based on a complete and coherent understanding of the relevant issues. While Joanne Kurfiss[13] explicitly states that critical thinking is an investigation to explore the situations, phenomenons, questions, or issues to get a hypothesis or conclusion about integrating all the available informations so that it can convince justified. John Chaffee[14] describes the critical thinking of the fragments, namely "think" which is defined as a way of understanding the world, and "critical" which is derived from the Greek word which means to question, understand and analyze. So that critical thinking is understood as a way of understanding the world (issues, phenomena, etc.) in a way to question, understand and analyze.

Fogler[15] states that the critical thinking skills consist of assessing the logic which is a specific statement; weigh and validate the evidence; assess the level of the logic of the conclusions; build counter arguments and hypotheses; asked insightful questions and probing, clarifying and assessing the reasonableness of an idea. Borich[16] mentions skills in critical thinking are identify the importance of the similarities and differences among the various elements or aspects of the task, categorize items in accordance with the characteristics that distinguish them, separating the entire body into parts that are meaningful and understand the interrelationships between parts, determine the cause of an event, making conclusions about trends and the effects of an event or the consequences of choices based on the evidence, make judgments about something to measure against standards. It involves identifying the precise criteria and assesses the extent to which these criteria are met.

2.4 Metacognitive

Metacognitive is part of the learning activities in which students will be encouraged to think about what they think or what is often called the thinking about thinking. Regulatory knowledge and thinking process is often referred to as metacognition[17] While traditionally metacognitive defined as the experience and knowledge we have about our own cognitive processes[18] Weinert and Kluwe[19] states that metacognitive is a second-order cognition that means thinking about thinking, knowledge of knowlefge, or a reflection of the actions. Borich[20] describes metacognitive as a process to monitor, evaluate and revise their thinking in order to arrive at a conclusion and more via decision. Metacognitive skills not only encourages students to simply think, but also examine, plan, organize, monitor, predict, and evaluate their own thought processes, which is the implementation required specialized mental operations[21]

Metacognitive approaches can be done by monitoring themselves. This was stated by some experts. Schwartz and Perfect[22] explain that it is a metacognitive monitoring processes that allow individuals to observe, reflect, or have their own cognitive processes. Flavell in Maulana[23] also states that this form of self monitoring activities can be regarded as a form of metacognition. Other experts argue that metacognitive approach can be reflected. McGregor[24] reveals that the word 'meta' is the ability to think about thinking itself, and correcting the ideas and viewpoints through reflection.

3. RESEARCH METHOD

This research used a one group pre-test post-test design[25]. This study was a weak experiment research model[26]. It is called weak experiment because the study lacked a control class and was only tried once, so it cannot give accurate results. This research model was selected because the school where the researchers conducted this research only has one class of grade 12 IPS. The time spent by the researchers to conduct this research is also very limited and impossible to conduct ongoing research models such as cycles, so the weak experiment research of one group pre-test post-test is considered suitable to prove the theory. In this design, a group of subjects were first given a pre-test, then treated using problem based learning method and lastly, they were given a post-test. The score difference between pre-test and post-test will be used as the assumptions of the treatment effects.

This study was conducted on 12nd November 2015 during Economics lessons. The subjects were 28 grade XII students in Social class.

In this research, the data collected using several techniques such as questionnaires and interviews. The research method applied in this study was a quantitative method, where the data analysis was done descriptively and inferentially. The data collected were analyzed and interpreted using the statistic (N-gain) calculation.

4. RESULT AND DISCUSSION

4,1 RESULT

4.1.1 Summary of Results Pre-test and Post-test on Critical thinking Perception

NO	NAME	PRE-TEST SCORE (Scale 40)	POST-TEST SCORE (Scale 40)
1	AR	25	30
2	AM	20	19
3	BO	26	27
4	CP	24	31
5	CY	24	24
6	CT	30	36
7	CJ	21	25
8	DE	27	24
9	EC	30	34
10	EU	20	23
11	EA	32	40
12	FY	26	28
13	JM	27	30
14	JD	27	24
15	KL	25	25
16	KD	28	30
17	KU	33	27
18	KY	24	24
19	KZ	23	24
20	MS	30	34
21	NJ	23	26
22	NO	24	28
23	NI	29	30
24	RT	27	27
25	RH	32	32
26	RI	24	24
27	TA	25	30
28	YJ	28	28

Based on the result summary on pre-test and post-test on critical thinking perception, we can obtain the maximum score, minimum score, average score, and standard deviation, which can be seen in Table
Perception Assessment Critical thinking

	Pre-test	*Post-test*
N	28	28
Min score	20	19
Max score	33	40
Mean	26,22	28,36
Std. Deviation	3,48	4,83

After the descriptive analysis of the critical thinking perception, it is known that the minimum score obtained in the pre-test is 20 and the maximum score is 33. The average of the pre-test is 26.22, and the standard deviation score is 3.48. The analysis is then performed on the score of the post-test. The minimum score obtained in post-test is 19 and the maximum score is 40. The average post-test score was 28.36 and the standard deviation score is 4.83. The standard deviation on the post-test shows that the distribution of data is further away from the average score and more varied than the pre-test result. Based on the data obtained on students' critical thinking perception, it appears that there is an increase in the average value of students' critical thinking perceptions is 2.14. Also note that there is a student who obtains the maximum score in the post-test questionnaire with score 40.

4.1.2 Summary of N-gain on Cririca thinking Perception

Description	***N-gain***
N-gain Min	-0.23
N-gain Max	1
N-gain Mean	0.18

4.1.3 Distribution Frequency of N-gain on Critical thinking Perception

N-gain Description	**Frequency**	**Precentage**
N-gain > 0,7	1	3,57%
0,3 ≤ *N-gain* ≤ 0.7	7	25%
0.0 ≤ *N-gain* < 0.3	17	60,72%
N-gain < 0	3	10,71%

In the table above, it can be seen that 25% of students obtained N-gain in the medium category, 60.72% of students obtained N-gain in the low category, 3.57% of students obtained N-gain in the high category, and 10.71% of students obtained N-gain in negative categories. N-gain negative means that the score of the post-test obtained by the students is lower than the pre-test score. It shows that there was not any increase on the perception of critical thinking in all three of these students. The highest precentage of N-gain calculation is at the low category, which means that there was an increase but not convincing enough.

4.1.4 Discussion of Perception Critical Thinking

Hypothesis Test Results on Critical thinking Perception

Variable	**Hypothesis**	**Accepted**	**Rejected**
Critical thinking Perception	$H_{0:}$ *N-gain pre-test* = *N-gain* post-test	√	
	$H_{1:}$ *N-gain pre-test* ≠ *N-gain* post-test		√

This research was conducted by using a problem in an article with a topic "koperasi" as the learning resource to be analyzed. The problems in the article serve as a stimulus to provoke students to think and solve these problems. This is in accordance with the opinion of another expert named Majid[27] which explains that "Methods of problem solving is how to give sense to stimulate the students to pay attention, study and think about an issue to further analyze the issue in an attempt to solve problem.".

Based on the results of the descriptive analysis, it is known that there is an increase on the students' critical thinking perceptions after using the problem based learning method. The average value of the pre-test and post-test on critical thinking perception has increased at 2.14. It shows that the steps in problem based learning can accommodate the ability of critical thinking of students to analyze and evaluate the conclusions based on the complete and coherent understanding of the relevant issues or problem[28]. However, after the analysis of the N-gain calculation in inferential analysis, it is known that the improvement obtained is in the low category. The average N-gain obtained was 0.18. It means that there is a score difference on students' perceptions of critical thinking before and after the treatment with problem-based learning method, even though the difference is low. This proves the explanation given by Borich[29] which said that the problem based learning method can improve critical thinking skills are appropriate, although still low. Based on the results of this analysis, we can conclude that H_0 is rejected and H_1 is accepted.

The low increase that occurred in this study is because the students are still not familiar with the learning method being used, which is problem based learning. From the interview, (Appendix G-2) on one of the students with initials KL who does not experience an improvement in the perception of critical thinking assessment, it is known that during the Economic lessons in grade 12, it has never been applied the problem based learning method. This makes students feel unfamiliar and difficult to do their task in analyzing

problem from the learning resources. This is in accordance with the law of repetition in education, which emphasizes that if a learning activity was done repeatedly would be quick, easy and precise[30].

Furthermore, in an interview conducted to KL, the researchers also asked about the time alocation for doing tasks using problem based learning method, she said that there should be enough time given to do the task. However, because they are new and not familiar with the model, then the time seems not enough and that made them did the tasks in a hurry. It is perceived to be the cause of students' low critical thinking perception. This is consistent with the theory of the weakness of the problem based learning method proposed by Djamarah & Zain[31] which says that the implementation of this method requires a long time.

The data result also shows a negative increase or decrease in ratings from pre-test to post-test of three students, namely AM, DE and JE. These three students are male. Based on the observations, these three students were not serious in doing their job and tend to rely on their peers, who sequentially were AR, BO and CT. This shows the determination of the group with a pair of boys and girls is not reached. At the time of filling out the questionnaire, these students submitted theirs quicker than others, so the researchers suspect they did not read every statement seriously.

Interesting finding obtained by researchers is that there is one student with the initials EA had a very high increase in both the value and N-gain. EA is a female student. The difference score of pre-test and post-test on students' critical thinking perception is 8 (on scale 40) with the acquisition of N-gain 1. This increase is extremely high and surprising. Most of her friends had a slow improvement and even decreasing, while EA is the only student who has an increase in high category. Commenting on the findings, the researchers tried to do interview with EA and got the answer that EA had no difficulty in doing the task with problem based learning method. According to her, the instruction given was clear that EA had no difficulty in doing the task given. EA also found this method can help to improve her critical thinking skills. This is consistent with the explanation given by Borich[32] which says that the problem based learning method can improve critical thinking skills.

The surprising thing about the high improvement of EA is that her partner namely KY is actually had no increase at all (N-gain = 0). Based on the observations of the researchers, KY is a passive student in every meeting in the classroom, not just when the researchers conducted the study. At the time of the implementation of problem based learning method, KY tend to be passive and depended on EA. At the time of working on filling the questionnaire, KY seemed to waste his time (laying head like sleeping on the table) and just used little time to work on the questionnaires in a hurry. The researchers assumed that KY was lacked of seriousness in participating during learning activities that led to the increase.

4.1.5 Metacognitive

Summary of Pre-test and Post-test Metacognitive Skills

NO	NAME	PRE TEST SCORE (Scale 55)	POST TEST SCORE (Scale 55)
1	AR	32	36
2	AM	26	31
3	BO	36	39
4	CP	33	43
5	CY	34	35
6	CT	38	47
7	CJ	35	39
8	DE	38	32
9	EC	44	46
10	EU	16	25
11	EA	40	54
12	FY	38	43
13	JM	31	40
14	JD	34	35
15	KL	36	40
16	KD	42	45
17	KU	40	47
18	KY	33	33
19	KZ	33	33
20	MS	40	49
21	NJ	33	36
22	NO	33	37
23	NI	39	41
24	RT	36	35
25	RH	46	48
26	RI	27	27

27	TA	33	41
28	YJ	35	34

Metacognitive Skills Assessment

Description	***Pre-test***	***Post-test***
N	28	28
Score Min	16	25
Score Maks	46	54
Mean	35.04	38.97
Std. Deviation	5.87	6.89

After analyzing the data of metacognitive skills descriptively, it is known that the minimum score obtained in the pre-test is 16 and the maximum score is 46. The average of the pre-test is 35.04, and the standard deviation score is 5.87. The analysis is then performed on the score of post-test. The minimum score obtained in post-test is 25 and the maximum score is 54. The average post-test score was 38.97 and the standard deviation score is 6.89. The standard deviation on the post-test shows that the distribution of data is further away from the average score and more varied than the pre-test results.

Based on data obtained from students' metacognitive skills questionnaire, it can be seen that there is an increase in the average score on students' metacognitive skills, which is 3.93. Also note that there is a student who obtained almost perfect score on the post-test questionnaire with a total score of 54 out of the maximum score 55.

4.1.6 Summary of N-gain on Metacognitive Skills

Description	***N-gain***
N-gain Min	-0.35
N-gain Max	0.93
N-gain Mean	0.21

4.1.7 Distribution Frequency of N-gain on Metacognitive Skill

N-gain Category	**Frequency**	**Precentage**
$N\text{-}gain > 0{,}7$	1	3,57%
$0{,}3 \leq N\text{-}gain \leq 0.7$	6	21,43%
$0.0 \leq N\text{-}gain < 0.3$	18	64,29%
$N\text{-}gain < 0$	3	10,71%

In table above, it can be seen that 21.43% of students obtained N-gain in the medium category, 64.29% of students obtained N-gain in the low category, 3.57% of students obtaining N-gain in the high category and 10.71% of students obtaining N-gain with negative categories. N-gain negative value means that the score of the post-test is lower than the pre-test score. This shows that there was no increase in these three students' metacognitive skill. The largest percentage gain in the calculation of the N- gain distribution is in the low category which at 64.29%. This means that there is an increase that occurred in students' metacognitive skills, although the increase is still in the low category.

4.2 Discussion

4.2.1 Hypothesis Test Results Metacognitive Skills

Variable	Hypothesis	Accepted	Rejected
Keterampilan Metakognitif	H_0 *N-gain pre-test* = *N-gain* post-test	√	
	H_1 *N-gain pre-test* ≠ *N-gain* post-test		√

The use of problem based learning method in this study involved detail stages by using the theory of Nora Teo[33]. The stages are set out in the guideline questions to analyze the articles, which are: (1) find a problem in the article, (2) collect information related to the problems found, (3) analyze the information that has been obtained on the basis of learning resources, (4) create a solution that can be achieved, (5) make the conclusion. These stages are used as a guideline for students to perform activities such as metacognitive reflection or self-monitoring in order to see the progress of learning. This is in accordance with the opinion of Flavell[34] which states that the form of metacognition is monitoring the activities themselves.

Based on the descriptive analysis results, it is known that there is a difference on students' metacognitive skills after participating in learning by using problem based learning method. The average score of the pre-test and post-test metacognitive skills is increased by 3.93. This proves that the problem based learning method managed to improve students' metacognitive skills. This condition is consistent with the theory by Neo and Chyn[35] that states that methods of problem based learning can encourage students' metacognitive skills.

The next step in the analysis of variable metacognitive skills is performing analysis with N-gain calculation in inferential analysis. The results of this analysis showed that the increase is still low. The average N-gain obtained was 0.21. It is included in the low category. This means that there are differences on students' metacognitive skill before and after treatment, although the difference is low. It is concluded that H_0 is rejected and H_1 is accepted.

Similar to the analysis of the perception of critical thinking assessment, the slow growth in metacognitive skill assessment that occurred in this study is because the students are still not familiar with the learning method used, thus affecting the assessment of their thinking abilities. From the interview, (Appendix G-2) conducted to one of the students with the initial KL who experiences an increase in metacognitive assessment at 4 (scale 55) with N-gain of 0.21, it is known that during the Economic lessons in grade 12, this method has never been applied to assess metacognitive skills such as self-assessment questionnaire like the researchers did. This makes the students feel unfamiliar and difficult to assess the development of their thinking and learning ability. This is in accordance with the law of repetition in education, which emphasizes that a learning activity if done repeatedly would be quick, easy and precise[36].

The next cause is performing tasks related to the implementation of the problem based learning method. Novelty aspect of the method used in doing the task is making students find difficulty in doing the task, so it affects the assessment of the development of thinking and learning. Students tend to undervalue themselves because they feel unable to do their job. It is perceived to be the cause of the low result of the students' metacognitive skill assessment. This goes along with an explanation of the law of repetition in learning. Bustos and Espiritu[37] states that the repetition of the experience of learning activities can also increase the possibility of the right response. This gives the sense that if students repeatedly used the problem based learning method and asked to fill out a questionnaire to assess the development of metacognitive skill, students will be able to provide a response or assessment in accordance with the actual situation.

Data processing result also showed a negative increase or decrease in ratings from pre-test to post-test in three students, namely the EC, RT and the YJ. These three students are male. Based on the observations, EC and RT did have difficulties in studying Economic in general, especially RT. Almost in every task given, RT's scored is below the standard minimum of completeness criteria. While the EC and YC tend not to be serious in learning in the classroom and often do not listen to instructions given by the teacher. Students YC even filled out the questionnaire with the same answer in most of the statements and only differed by one point in a statement. This shows the lack of his seriousness in reading every statement. At the time of doing the task using problem based learning method; these three students are not serious in doing their job and tend to rely on their peers, who sequentially were CP, JM and MS. Therefore, the researchers assumed that all of these three students rate themselves low because they did not contribute much in the learning process that day.

Overall, the researchers conducted a carelesness where researchers did not explain in detail the purpose of metacognitive assessment questionnaires. The researchers only explain the learning objectives and the way the process briefly. This is because the time remaining to fill the questionnaire is very limited, while it took

quite a lot to explain the purpose of assessing metacognitive skill considering it was the very first time for them to do it. Whereas the purpose of learning is conveyed properly, should motivate the students to perform their duties, because the students understand the purpose and the benefits they will gain from the learning process in which they were involved. This is consistent with the explanation given by Wong and Wong (2009, p. 88), emphasizing that a well-managed classroom has a orientation or purpose on performing tasks so that students know the expectations of the task and how to do it. It is considered to be one factor that contributes to the students' lack of seriousness in filling the self-assessment questionnaires.

Interesting finding obtained by researchers is that the student with major increases in metacognitive assessment is the same student who had the highest increase in critical thinking perception assessment. The student with an initial EA has a very high increase in both the value and N-gain. The difference in assessment of ES's metacognitive skill on pre-test and post-test is 14 (on a scale of 55) with the acquisition of N-gain of 0.93. This increase is extremely high and surprising. Most of her friends had a slow improvement, there is even decreasing, while EA is the only student who has increased with the higher category. Commenting on the findings, the researchers tried to interview with EA and get a unique answer. Students EA said that the increase in the development of thinking and learning is not felt directly. EA said that she was unaware of the improvement. EA admitted that she realized it after answering the questionnaire related to the implementation of the tasks assigned using the model of problem-based learning. EA had no difficulty in doing the task with a problem based learning method. She was able to do the work and that made her assess her development of thinking and learning with a high rate.

The surprising thing about the improvement of EA was that her peers that KY is actually had no increase at all (N-gain = 0). Similarly with the critical thinking assessment, KY filled out the pre-test and post-test questionnaire exactly the same. There is no difference at all. All statements filled with point 3. His passivity in participating during the learning activities and tendency to rely on EA when working on tasks using problem based learning method is a factor influencing his assessment of the development of thinking and learning. The researchers assumed that KY is lacked of seriousness in participating in learning activities that lead to the same indifference to fill out the questionnaire which is filled with the same points.

5. CONCLUSION

Based on the results of research and discussion on this research entitled "The Application of Problem Based Learning to Increase Critical Thinking And Metacognitive Grade XII Students At Senior High School (SMA) "XYZ" Makasar" obtained the following conclusions:

1. There is the effect of the application of methods of problem based learning to the perception of critical thinking of grade 12 students on the topic of 'Koperasi'.
2. There is the effect of the application of methods of problem based learning to metacognitive skills of students in grade 12 on the topic of 'Koperasi'.

The above conclusions obtained based on the average increase on students' critical thinking perception and metacognitive skills. Nonetheless, improvement obtained is still in low category of N-gain which is 0.18 for critical thinking perception and 0.21 for metacognitive skill. So it can be stated that H_0 is rejected and H_1 is accepted. In general, the slow growth factors obtained in both of the independent variables are the novelty aspect of learning method used which is problem based learning.

Based on these results, researchers realized that as a teacher, the role as a facilitator and a guider is a responsibility that must be implemented correctly. Teachers are responsible for providing tools and learning environment that encourages students to think critically of the phenomenon and the world issues that are contrary to the Word of God. Teachers are also responsible for guiding students in the process of learning, so that students can achieve the expected learning goals.

These results indicate that an increase in the perception of critical thinking perception and metacognitive skills of students still at the low category, so it still needs to be improved. It is a matter of reflection of researchers, and will be corrected when the researchers conducted a teaching assignment in the future.

5.1 RECOMMENDATIONS

Based on the conclusions that have been formulated and observations during the learning, researcher gain several recommendation, which are:

1. For other teachers, the application of problem based learning method needs to be applied repeatedly to develop the habit of critical thinking, so as to respond to the issues on the daily life.
2. For other teachers, to overcome the shortcomings of problem based learning in terms of finding a problem that is relevant to the context of students' lives, it is advisable to arrange your own problems or modify the problems derived from sources that are already available based on the students' real life conditions.
3. For other researchers and teachers, it is advisable to submit detailed learning objectives before implementing the problem-based learning method into learning so that students understand the purpose of learning and motivate them to achieve it.
4. For the researchers, are expected to develop a model to apply the learning problem based learning in other topics.
5. For further research, it is expected to conduct and develop a research on problem based learning method using other research design which is more accurate.

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