Improving Critical and Creative Thinking through Discovery Learning in Entrepreneurship Lessons

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Abstract: This research aims to understand increased capacity think critically and creative and knowing opinion students in terms of the capacity to think critically and creative learning after conducted by the use of discovery learning .This research using methods quasi design experiment with the control group non equivalent of .Sampling done with sampling techniques purposive namely one as a class experiment and one as a class of control. Discovery learning the result is better able to improve thinking skills critical and creative on two cycles namely by value asymp.sig value of 0.000< 0.05 it compared with conventional model of learning, and most of the students felt the capacity to think critically and creative learning increase during done with discovery learning model.

1 INTRODUCTION

Entrepreneurship having such a big for a country economic development .Many entrepreneurs would have profound effects for better a country economy. Wirausahaakan created a variety of products with a ciptanya which will then absorb the labor and mobilized available resources to increase productivity national. Entrepreneurship having such a big for a country economic development .Many entrepreneurs would have profound effects for better a country economy .Entrepreneurs will create a variety of products with a ciptanya which will then absorb the labor and mobilized available resources to increase productivity national.

> "Based on data from BPS 2016 with a population of 252 million , the number of entrepreneurs non agricultural who settled reached 7,8 million people or 3,1 percent .Therefore the level of indonesia has become entrepreneurship 2 percent of the population , as conditions at least a society would flourish .And he also mnegatakan that entrepreneurial ratio of 3,1 percent was much lower than in other countries , like malaysia % 5 , china 10 % , singapore % 7 , japan % 11 and 12 % US" (Humas Kementrian Koperasi dan UKM.2017.Ratio Wirausaha Indonesia Naik Jadi 3,1 Persen. http://www.depkop.go.id/content/read/ratio-wirausaha-indonesia-naik-jadi-31-persen/, diakses tanggal 24 juli 2017).

Efforts have been made the government to raise entrepreneurs .Of course this had received a positive response by the department of education and culture by inserting lessons entrepreneurship as a subject obliged in national curriculum. Entrepreneurship learning not only given to the level of vocational education but also given at the primary school, junior high and high schools. At a vocational high school known as the art projects and entrepreneurship.

> "Subjects the art projects and entrepreneurship can be grouped into knowledge transcience knowledge, which is develop knowledge and training skills based skills life art and technology economic based .It began with learning exercise expression creative to pour ideas and the idea that please others, and rationalized in teknologis that these skills rises appreciation new technology, ergonomic results and applicative in utilizing the environment with regard to the ecosystem, management and economically" (Yandriana, 2013. Kompetensi Inti dan Kompetensi Dasar Prakarya dan Kewirausahaan untuk SMA, SMK dan MA. www.yandriana.wordpress.com, diakses tanggal 24 Juli 2017.

Considering the importance of creative thinking for students so students can compete in the world of work and his private life, hence the ability of creative berikir important developed in learning activities .Of

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schools as institutions is very formal education play important roles in cultivate and develop the ability of creative thinking students .One of the subjects prioritising creative thinking the students were on the subjects of group b curriculum 2013 in vocational high school that is the lesson the art projects and entrepreneurship.

According to novan (2012: 23), ”creativity is an effort to create a mental ability and various kinds of skills typical man who produce disclosure unique, different original, entirely new, beautiful, efficient, target and and innovation right to exist because of an effort to create a higher”.

One of the effort make students can think critical and creative is through the proper learning model. discovery learning was one of the curriculum recommended in 2013. Research conducted Prof Dr Abdelrahman Kamel (2014) show discovery learning strategy helped to recruit activities where students learn for them selves and apply what know it in new situation which in turn led to achieving effective learning. From the interviews and the fact in the field, showed the capacity to think critical and creative students of vocational high school airlangga sidoarjo is low. The lessons students have so fulfilling in aspect of knowledge and skills, studies in the field show in practice teachers still in a conventional put students as audience and registry, so that the pattern think students have developed because of learning only hooked on teachers. Leading to the need for proper strategy in changing thought process students became more critical and creative. Because basically role of teachers only have a facilitating, teachers should be able to help students to obtain pemahamanya itself against matter. Discovery learning as a model learning was hoped to change the think students became more critical to phenomena in the field to find an opportunity, with their creativity made opportunities as a step in innovate as a enterpreneur. Discovery learning able to change learning that teacher oriented to student oriented, change from students who just received information overall the discovery the students to find information own. According to background has been told above, the study is done to see if there has been increasing the capacity to think critical and creative through learning with discovery learning? and how opinion of the students learning using discovery learning?

2 LITERATURE REVIEW

2.1 Learning Model

In the process of teaching and learning required a strategy required by teachers in carrying out teaching and learning activities, according to Seels & Richey (1994) model means abstraction something used to help understand something that can not be seen or experienced directly. The learning model in accordance with the implementation of the 2013 curriculum is the meaning of Problem Based Learning model, Project Based Learning model, and Discovery/Inquiry Learning model of Learning. Learning model used must be adapted to the learning materials. Certain learning models are appropriate only for specific learning materials. Conversely a particular learning material will be able to succeed maximally if using a particular learning model.

2.2 Discovery Learning

Discovery is a learning model developed in the perception constructivism. Where this model insists on the importance of knowledge of a concept in learning through the involvement of students actively in learning .Discovery learning is a model to develop a way to study for students active with find yourself, investigate own, so the results be loyal and durable to memory, will not be easy forgotten students .By learning discovery, children can also learn reflect analysis and try to solve the problem facing own. In learning, the students were encouraged to find yourself and transform information complex, check new information with existing in his mind, and expand into information or capability in accordance with the environment and age, the place and time he lives.

2.3 Critical Thinking

Gunawan said (2003: 177) think critically is the ability to think the level of complex and using a process of the data analysis evaluation. There are 6 indicators in measuring think someone. As noted (facion filsame, 2008) namely (1) interpretation is understand and expressing the meaning of numerous experiences, the situation, data, the incident, assessment, habits, a procedure or criteria. (2) of analysis inferential identify relations meant and actual of statement, question, the concept, description, or form repretasi other. (3) evaluation menaksir credibility the statement or representation.

(4) inference means identify and obtain the the necessary to make inferences.

2.4 Creativity

An entrepreneur is always inseparable from creativity and innovation. Novan (2012: 23) says that "creativity is an effort to be creative which is a mental ability and various types of typical human skills that can give birth to unique disclosure, different original, completely new, beautiful, efficient, targeted and appropriate and innovation created because An effort to create a higher. "Be creative can be done by developing things that already exist to be better again. By creating a human being will be more appreciated, known and has a characteristic of his creation.

3 METHODS

This research is a quasi research experiment because researchers intend to provide treatment to subject research to next wants to know the whereabouts of treatment increased the. The treatment is learning model dikelas discovery learning and learning experiment direct (direct instruction) in class control. To know the influence of a model of learning discovery learning on increased capacity to think critically and creativity required class students other learning old model (ekspository) who practiced daily as for comparison. Results from class this control will become comparator of a class experiment to know whether the results of a class experiment higher or better than class control .

The design experiment used the equivalent control non grups design.About design this is pretes, treatment and postes. Pretes and postes given to the (experiment and control) sedangkkan treatment only given to the experiment.But the design is as follows:

E O1 X O2 Suharsimi A (2010: 12)
K O3 O4

To assess the critical thinking and creativity of students during the learning took place the authors used measurement instruments indicator critical and creative thinking, to know the opinions of students on this learning model used a questionnaire filled after the end of learning. The population in this study all students of SMK Airlangga Sidoarjo class X. Sample selection is done by purposive sampling technique that is one as the experimental class is the class X1 and the one as the control class is the class X2.

4 RESULTS AND DISCUSSION

Improvement of critical and creative thinking in students who receive discovery learning learning compared to students who received direct learning the competence taught in this research is the craft with the inspiration of the object of local culture, with two cycles.

Table 1: Syntax of Learning Discovery Learning Model

Fase	the activities of teachers
1. Prepare students and deliver goals	Organizing, orientation, apperception, motivating the importance of understanding the craft of local cultural inspiration, giving references and dividing learners in groups with each group of 4 students.
2. Stimulation	Observing: observing the cultural diversity of Indonesia Questioner: Discuss opportunities gained by an entrepreneur from the cultural diversity of Indonesia Discuss the problems, objectives and working steps of planning the business.
3. Data collecting	Collect data: collect field data (observations) to find business opportunities and find other sources that support
4. Data Processing	Associating: Processing the data obtained by making the planning and production process of local cultural inspiration works
5. Test results	Associating: Counting data planning and production process errors (according to local concept, theme, and condition)
6. Generalization	Associating: Arranging conclusions by creating a written planning report

The core activity of the discovery learning model lies in the second to sixth phases. Students are given the opportunity to find problems, find solutions, and conclude the results of completion by combining the concept with field conditions so that students are able to think analytically by doing a search trying to solve their own problems so that results will be durable in memory, will not be easily forgotten students.

Result of students' critical thinking skills in the experimental class.

Table 2: Results of critical thinking skills in experimental class (Including indicators of interpretation, analysis, evaluation and inference)

		TKA	TES1	TES2
N	Valid	35	35	35
	Missing	0	0	0
Mean		54.49	75.97	88.54
Median		56.00	75.00	88.00
Mode		50	75	88
Std. Deviation		10.074	10.551	6.917
Minimum		25	50	69
Maximum		69	94	100
Sum		1907	2659	3099

From the above table it is known in the experimental class that it has improved both from the initial ability test, cycle I and cycle II with an average of 54.49; 75.97; And 88.54. Average score gain gain of critical thinking is 0.47 and 0.53 (medium category) Standard deviation shows the ability of critical thinking is very varied, critical thinking ability in the scale of the minimum value has increased ie 25; 50; And 69 with a maximum score of 69; 94; And 100. The result of student's observation shows that students are very enthusiastic in solving the problems given by the teacher through worksheet by unifying the concept of what is received from teacher, book, internet and direct observation in field changing the original teacher center become student center, From what they do not know. The discovery learning model applied to the experimental class can improve critical thinking skills.

4.1 The results of critical thinking on the control class

Table 3: Results of critical thinking skills in the control class (Including indicators of interpretation, analysis, evaluation and inference)

		TKA	TES1	TES2
N	Valid	35	35	35
	Missing	0	0	0
Mean		53.06	64.66	65.06
Median		56.00	63.00	63.00
Mode		63	63	63
Std. Deviation		9.828	8.246	8.324
Minimum		38	44	44
Maximum		69	81	88
Sum		1857	2263	2277

From the above table it is known in the control class that the number of students in 35 has increased but is relatively small both from the initial ability test, cycle I and cycle II with an average of 53.06, 64.66; And 65.06. The average score of gain is 0.23 and 0.01 (low category) The standard deviation shows the critical thinking ability varies greatly, the critical thinking ability in the minimum value scale is 38; 44; And 44 with a maximum score of 69; 81; And 88. The data shows that there is an increase after the conventional learning process in the control class but the low categorized increase. Based on student observation less enthusiastic because the learning centered on teachers, passive students, and did not find things - things that they find apart from teacher information. From Table 1 and Table 2, there is a difference of descriptive statistics between the experimental class and the control class. The average value, the highest value, and the gain gain of critical thinking are still better experimental classes than control classes. Learning discovery learning model can improve students' critical thinking process when compared with conventional learning pattern.

The ability of creative thinking in students who get discovery learning learning is better than those who get direct learning. Research conducted by researchers in line and by another study suggested by Noor Syafi'i (2013) show that the discovery learning to increase the process think critically which includes interest in asking questions, apply the concept, and settle from different ways. His research conducted by Windarti, and Tjandrakirana Widodo (2013) show learning by using the method discovery terbimbing effective to train skills think kitis junior high school student.

4.2 The result of creative thinking ability in the experimental class

The creative thinking ability of the students is done by using the skill assessment of the students' ability to produce the work with inspiration of local cultural object which includes the stage of idea searching, sketching, prototyping and product making. The following is the distribution of students' creative thinking ability in the experimental class:

Table 4: Statistics of students' creative thinking ability in the experimental class (Includes indicators of fluency, detail, flexibility, originality)

		TKA	TS1	TS2
N	Valid	35	35	35
	Missing	0	0	0
Mean		49.09	78.14	87.00
Median		50.00	75.00	88.00
Mode		50	75	94
Std. Deviation		10.866	10.190	8.530
Minimum		25	50	56
Maximum		69	94	94
Sum		1718	2735	3045

From the above table, it is known in the experimental class that there is an improvement of critical thinking ability both from the initial ability test, cycle I and cycle II with an average of 49.09, 78.14; And 87. Average score gain of critical thinking is 0.58 and 0.39 (medium category) Standard deviation shows the ability of critical thinking is very varied, critical thinking ability in the scale of minimum value has increased that is 25; 50; And 56 with a maximum score of 69; 94; And 94.

At the time of learning both cycle 1 and cycle 2 of the observation, students in the group are very enthusiastic solve the problems given teachers through the worksheets by looking for inspiration ideas from various sources, write and develop ideas that they can then make a sketch to make their ideas come alive, Followed by making ideas in 3 dimensions through the prototype, and the final stage of creating a variety of product creations, the ideas they have a variety of students freely search and determine ideas according to the subject without being determined by the teacher, the creativity of students appears even many products with various innovations that appear And not obtained from other sources.

Table 5: Statistics of students' creative thinking ability in the control class (Includes indicators of fluency, detail, flexibility, originality)

		TKA	TES1	TES2
N	Valid	35	35	35
	Missing	0	0	0
Mean		48.20	53.43	58.20
Median		50.00	50.00	56.00
Mode		50	50	50[a]
Std. Deviation		7.415	5.611	7.062
Minimum		38	44	50
Maximum		63	63	69
Sum		1687	1870	2037

From the above statistics table, it is known in the control class that the number of students in 35 has increased the ability of creative thinking, but relatively small both from the initial ability test, cycle I and cycle II with an average of 48.4; 53.4; And 58.2. Average gain scores are known to be 0.09 and 0.10 (low categories), the distribution of creative thinking capacity is not very large, creative thinking ability on a minimum value scale of 38; 44; And 44 with a maximum score of 69; 81; And 88.

Based on the results of observations students are less flexible in determining ideas, ideas obtained as exemplified by the teacher, they make sketches, prototype as what is exemplified although there are few students who start adding their own creations, but in terms of originality has not emerged towards innovative this is due to the pattern Learning is still teacher-centred, causing the mind set of students to not develop.

From Table 1 and Table 2, there is a difference of descriptive statistics between the experimental class and the control class. The average value, the highest score, and the increased gain of creative thinking are still better experimental classes than the control class. Learning discovery learning model can improve students' creative thinking process when compared with conventional learning pattern.

This is the result of researchers according to research conducted by Prof. Dr Abdelrahman Kamel Mahmoud (2014) saying discovery learning strategy helped to recruit activities the where students learn for themselves and apply what know it in new situations which in turn led to achieving effective learning. And research conducted by Siti Handayani, Pargito, and Trisnaningsih (2015) showed discovery learning in the three cycles show increasing creativity student learning.

4.3 Data analysis

Data analysis was done with SPSS program version 22, The first Prerequisite test was conducted normality test, after the normality test with Kolmogorof-Smirnov test showed the gain of 1 experiment 0,142 gain 1 experiment equal to 0,142> 0,05 meaning the normal distribution, gain 1 control equal to 0,200 > 0,05 means the normal distribution, but the gain of 2 experiments is 0.000 <05 then the distribution is not normal and the gain of 2 controls is 0.000 <0,05 abnormal distribution, because the abnormal distribution data is done Mann Whitney test with result :

Table 6: Hypothesis Testing Results Critical Thinking Ability gain experimental class and control class

Test Statistics[a]Gain 1	
	Critical Thinking
Mann-Whitney U	182.500
Wilcoxon W	812.500
Z	-5.063
Asymp. Sig. (2-tailed)	.000
Test Statistics[a]Gain 2	
	Critical Thinking
Mann-Whitney U	4.000
Wilcoxon W	634.000
Z	-7.541
Asymp. Sig. (2-tailed)	.000

Based on the statistical test output in the mann-whitney test above it is known that the value of

Asymp.Sig. (2-tailed) is 0.000 <0.05 it can be concluded Ha accepted there is difference gain of critical thinking ability between experimental class and control class. There is an influence of using learning discovery learning model to critical thinking ability.

This is consistent with research conducted by N.Makoolati, M.Amini, SH Yazdani and Av.Razeghi (2013) said the higher level of learning in higher cognitive level and the preference of the students to Guide Discovery Learning compare lecture indicates their attention to active more modern learning methods and motivate them to further study and enhance learning in higher levels of cognition. His research conducted by Ali Gunay Balim (2009) said that there is a significant difference in favour of the experimental group over the control group in terms of academic achievement scores, perception of inquiry learning scores and retention of learning scores in both cognitive and affective levels.

Table 7: Hypothesis Test Results Creative Thinking Ability gain experimental class and control

	Creative Gain 1
Mann-Whitney U	9.000
Wilcoxon W	639.000
Z	-7.142
Asymp. Sig. (2-tailed)	.000
	Critical Thinking Gain 2
Mann-Whitney U	*179.500*
Wilcoxon W	809.500
Z	-5.187
Asymp. Sig. (2-tailed)	.000

Based on the statistical test output in the mann-whitney test above it is known that the value of both gain 1 and gain 2 is known asymil.Sig. (2-tailed) of 0.000 <0.05 it can be concluded Ha accepted there is a difference in gain 1 creative thinking ability between the experimental class With control class. There is an influence of using learning discovery learning model to creative thinking ability.

To know whether there is difference of mean of two samples is done analysis of statistical data Wilcom test so it can know whether there is difference or increase between Test of Ability of beginning, post-test of cycle 1 and post-test cycle 2.

Table 8: Wilcom Test Results Increased Critical Thinking Ability on Pre-test -Post-test 1, Post-test 1- Post-test 2 (Experiment Class)

		N	Mean Rank	Sum of Ranks
POST-TEST SIKLUS 1 - TES KEMAMPUAN AWAL	Negative Ranks	0[a]	.00	.00
	Positive Ranks	35[b]	18.00	630.00
	Ties	0[c]		
	Total	35		
POST-TEST SIKLUS 2 - POST-TEST SIKLUS 1	Negative Ranks	0[d]	.00	.00
	Positive Ranks	35[e]	18.00	630.00
	Ties	0[f]		
	Total	35		

	POST-TEST SIKLUS 1 - TES KEMAMPUAN AWAL	POST-TEST SIKLUS 2 - POST-TEST SIKLUS 1
Z	-5.186[b]	-5.204[b]
Asymp. Sig. (2-tailed)	.000	.000

Negative rank between pre-test and cycle 1, cycle 1 and cycle 2 is 0 either on the N value, Mean Rank or SUM Rank it shows no decrease in value, Positive rank between pre-test, cycle 1 and post-test cycle 1-post-test 2 Is 35 with the mean rank or average of the increase of mean 18 and SUM 630. Known Asymp.Sig. (2-tailed) in pre-test post 1 of 0.000 <from 0.05, and Asymp.Sig. (2-tailed) in post-test1 - post-test 2 of 0.000 <from 0.05 then Ha is accepted which means there is a difference between pre-post-test 1 study results, and post-test 1-post-test 2 which can be concluded there is influence of model Learning discovery learning on students 'critical thinking ability is learning discovery learning model can improve students' critical thinking ability in each cycle.

Table 9: Hasil Uji Wilcom Peningkatan Kemampuan Berpikir Kreatif pada Pre-test–Post-test 1, Post-test 1- Post-test 2 Kelas Eksperimen

		N	Mean Rank	Sum of Ranks
POST-TEST SIKLUS 1 – PRETEST	Negative Ranks	0[a]	.00	.00
	Positive Ranks	35[b]	18.00	630.00
	Ties	0[c]		
	Total	35		
POST-TEST SIKLUS 2 - POST-TEST SIKLUS 1	Negative Ranks	0[d]	.00	.00
	Positive Ranks	30[e]	15.50	465.00
	Ties	5[f]		
	Total	35		

Table 9. Cont.

Test Statistics[a]		
	POST-TEST SIKLUS 1 – PRETEST	POST-TEST SIKLUS 2 - POST-TEST SIKLUS 1
Z	-5.190[b]	-4.848[b]
Asymp. Sig. (2-tailed)	.000	.000

Negative rank between pre-test and cycle 1, cycle 1 and cycle 2 is 0 both on the value of N, Mean Rank and SUM Rank it shows no decrease in value, positive rank between pre-test and cycle 1 is 35 with mean rank or average - The average increase is equal to mean 18 and SUM 630. However, in cycle 1 and cycle 2 there are Ties of 5 meaning there is the same value between cycle 1 and cycle. Known Asymp.Sig. (2-tailed) in pre-test post 1 of 0.000 <from 0.05 and Asymp.Sig. (2-tailed) on post-test1 - post-test 2 of 0.000 <from 0.05 then Ha is accepted which means there is a difference between pre-post-test 1 and post-test1 - post-test 2 that can be concluded there is influence of the use of discovery learning model Learning to students 'creative thinking ability that is learning discovery learning model can improve students' creative thinking ability in each cycle.

According to the analysis of data on known discovery learning to increase the capacity to think critical and creative researchers supported by opinion research conducted by Khabibah , Masykuri and Maridi have shown that the use of module based on discovery learning on respiratory system matter is more effective in increasing students generic science skill. That which a component part of generic skill is critical thinking and creativity. And research conducted by Anyafulude Joy Ph.D. (2014) said discovery-based learning has promoted to great extent in effective teaching and learning and improved student's knowledge.

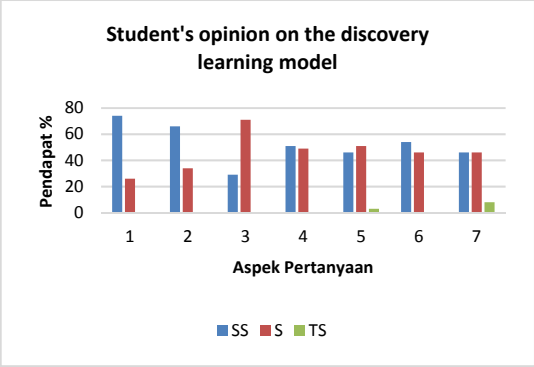

Figure 1: Students' opinions on learning activities using discovery learning model in terms of critical and creative thinking skills

From the above graph, it is known that students opinion after learning with discovery learning model shows 74% strongly agree, and 26% agree learning discovery learning model make more creative develop ideas. 66% strongly agree and 34% agree discovery learning provides freedom to create and work. As much as 29% strongly agree, 71% agree discovery learning can make thinking more critical. 51% strongly agree and 49% agree with discovery learning gives freedom in terms of mind set. 46% strongly agree, 51% agree and 3% disagree with learning discovery learning model gives the opportunity to understand more about material than conventional learning. 54% strongly agree and 46% agree learning discovery learning model is applied to entrepreneurship subjects. 46% agree, 46% agree and 8% disagree if this learning model is applied to the next material or other subjects, there are 3 students disagree because they feel bored if this learning model is applied continuously, so that the required variation or other teaching strategies to overcome this are certainly conditioned with the material to be taught. The result of questionnaire shows that most students feel the ability to think more critically and creatively during the learning process because this syntax of learning discovery learning requires students to think critically solve a problem through their mind set, and the students' creativity is more challenged because students are required to be active, learning becomes Centred. The researchers presented at odds with research Diana, Maridi and Yudi (2015) that students agree with the discovery learning to participate actively students, and never and saturated for learning that affects the study results.

5 CONCLUSIONS

Based on the research conducted can be concluded:

1. Learning discovery learning model proved able to improve critical thinking skills this is indicated by the test of critical thinking ability showed an increase of pre-test 54,49, post-test of cycle 1 equal to 75,97; And post-test cycle 2 is 88.54 with an average gain score of 0.47 and 0.53, this is reinforced by Wilcomn test which shows asymp.Sig. (2-tailed) in pre-test post 1 of 0.000 <from 0.05, and Asymp. Sig. (2-tailed) on post-test1 - post-test 2 of 0.000 <from 0.05 then Ha is accepted. Discovery learning is also proven to improve the ability of creative thinking aimed by the average results in each test that is 49.09, 78.14; And 87. Average gain scores increased critical thinking by 0.58 and

0.39 (medium category). Reinforced by a wilcomn test which shows asymp.Sig. (2-tailed) in pre-test post 1 of 0.000 <from 0.05 and Asymp.Sig. (2-tailed) in post-test1 - post-test 2 of 0.000 <from 0.05 then Ha accepted and it can be concluded there is influence of the use of learning discovery learning model to the ability of critical thinking and creative students that is learning discovery learning model can improve critical thinking skills and Creative students in each cycle.

The ability to think critically and creatively on students taught by discovery learning model is higher than conventionally it is proved by mann-whitney test each with Asymp.Sig (2-tailed) value of 0.000 <0.05 then it can be concluded Ha accepted. There is a difference in the gain 1 of critical and creative thinking skills between the experimental class and the control class. There is an influence of using learning discovery learning model to critical thinking ability.

2. From the results of student opinion analysis, most students feel the ability to think both critical and creative more developed after getting the teaching with the model of learning discovery learning. However, there are 3 students disagree if this learning model is applied continuously.

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