IMPROVING ECOLOGICAL INTELLIGENCE OF STUDENTS THROUGH THE UTILIZATION OF INORGANIC WASTE IN MAKING *FLIPCHART* AS A LEARNING MEDIA OF SOCIAL SCIENCE

(CLASSROOM ACTION RESEARCH AT SMPN 3 LEMBANG KAB. BANDUNG BARAT CLASS VIII-B)

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*Abstract--*Environmental disrespectful behavior such as the habit of littering, indifferent about the consumption of the environmentally friendly products, then the lack of knowledge of students about environment, also low ability of students in utilizing waste reflect that the ecological intelligence of class VIII-B SMPN 3 lembang is still lacking. Therefore it is necessary to take ways to improve the ecological intelligence of students. The efforts made for that is by utilizing inorganic waste in making flipchart as a learning media of social science. The expected objective of the research is improving the ecological intelligence of students in utilizing inorganic waste by describing started from planning, implementation, constraints and result of the improvement of the ecological intelligence of students. The classroom action research uses model of Elliot. The result of the research, first, the planning process is conducted to determine SK/KD, preparing RPP includes applying the flipchart media and preparing research instrument. Second, the implementation process is implementing learning aligned with the planning of the research. Third, the constraints in the research is, the students are puzzled yet to determine the theme of the flipchart which is made constraints, furthermore, make students consciously keeping the environment around them. Fourth, the result in the research shows the increasing in each cycle. Cycle I ecological intelligence of students in utilizing inorganic waste reached the category of "enough" that is 66.6%. Cycle II reached the "good" category that is 80.3%, and cycle III reached the "good" category that is 82.8%. Therefore it can be concluded that the utilization of inorganic waste made as a media of learning in the form of flipchart includes Including planning, implementation, and constraints and results obtained could improve the ecological intelligence of students.

Keywords : Ecological intelligence, Inorganic waste, flipchart

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I. PRELIMINARY

Individual habits such as littering, indifferent about the consumption of the environmentally friendly products, then the lack of knowledge of students about environment, also low ability of students in utilizing waste reflect the environmental disrespectful behavior. Based on preliminary observation data at SMPN 3 Lembang it is seen that the school has program that support the love of the environment however the program is not realized optimally for example is in utilizing of the used goods into useful goods, it does not seen the results of utilization of used goods in the school.

Likewise of the class that researcher does, in class VIII B noticed that *first*, the lack of learning practices in utilizing the inorganic waste (skills); *second*, the students are still disregard of what they have used (attitude); *third*, students are still given understanding in learning only in the cognitive domain of the material to be conveyed, the lack of linking about the problems that exist around (knowledge). So it could be said that students lack of the ecological intelligence.

The ecological competence according to Supriatna (2016 page 137) is knowledge, attitude and skills. In addition to the complete and comprehensive ecological intelligence developed by Goleman (in Muhaimin 2014 page 87) there are five indicators of ecological intelligence incorporated from emotional, social and ecological intelligence, in shaping and enhancing ecological intelligence:

a. Develop empathy for all life forms
b. Unify sustainably as a group practice
c. Make the invisible visible
d. Anticipate unexpected results
e. Understand how nature sustains life

Environmental problems, if the inorganic waste is not reduced it will increase the volume of waste piles that impact on environmental damage. Therefore it needs a way to reduce it through the concept of 3R (reuse, reduce, recycle). In line with this, Marliani (2014 page 128) describes the principle of utilizing inorganic waste such as by reducing, re-use, recycle, replace.

Integrated Sosial Science learning, Social Science is a set of facts, concept phenomenon, generalization related to human behavior and actions to build themselves, society, nation and environment (Supriatna, 2016 page 199). According to Sapriya (2009 page 8) in Social Studies, humans and the environment are central themes, both in the selection of content, approaches, sources and learning media. Social Science learning is applicative-oriented, developing thinking ability, learning ability, curiosity, and developing caring attitude toward social and natural environment. Ecological competence is very important to be included in the Social study as an

integrated study, because the materials related to the environment can be used to build social intelligence through sustainable concept.

Ecological intelligence must be an incessant process for a better life. Therefore, there must be a solution of waste that can be done by teachers for conservation and inorganic waste. One of the solution is to equip students to process their skills in reuse and recycle inorganic waste. Therefore , the easy and simple strategy that can be done is to collaborate the social learning by utilizing inorganic waste, as one of the learning media that is *flipchart*. According to Siliana and Riayan (2009 page 87) filpchart is a sheet of paper 50x 75 cm that resembles an album or calendar arranged in a sequence tied to the top. Flipchart is a visual media that one of the function is to give information symbolically. The use of this flipchart is the way for teachers save their time writing on the blackboard and is also very effective to make it easier for teachers to teach. As of the material delivered can be absorbed well by the students. The presentation of the information in the flipchart might be images, letters, diagrams and numbers.

Based on the background that has been described above, the authors are interested in conducting research by raising the title "Improving Ecological Intelligence of Students Through The Utilization of Inorganic Waste in Making Flipchart as A Learning Media of Social Science (Classroom Action Research at Smpn 3 Lembang Kab. Bandung Barat Class VIII-B)"

In general, the objective of research is to improve the ecological intelligence of the students by utilizing inorganic waste in social learning, this research is aimed to answer some*1.* formulation of problem as follows: *First*, how to plan the utilization of the inorganic waste in making flipchart as the learning media of social study to improve the ecological intelligence of the students ?. *Second*, how is the implementation of the utilization of inorganic waste in the making of flipchart as the learning media of social study to improve the ecological intelligence of the students ?. *Third*, how to solve the problem of inorganic waste utilization in making flipchart as the learning media of social study to improve the ecological intelligence of the students?. *Fourth*, how is the result of utilization of inorganic waste in making flipchart as the learning media of social study to improve the ecological intelligence of the students?

II.   METHOD

The research method used in this research is Classroom Action Research. Ebbutt (in Wiriaatmadja 2014 page 12) said that the classroom action research is a systematic review of improving the practice of education by a group of teachers by taking actions in learning, based on their reflection on the outcomes of those actions. In line with Ebbutt, Hopkins (in Wiriatmadja 2014 page 11) explains that classroom action research is a study that combines research procedures with substantive action, an action performed in the inquire discipline, or an attempt to understand what is going on, while engaging in a process improvement and change.

This research uses PTK model from Elliot (Wiriatmadja, 2012 page 62), which consists of seven components: Problem identification, Reconnaissance, Planning, Implementation, Observation, Reflection, Revision planning. The subjects of the study were students of class VIII-B SMPN 3 Lembang with 36 students, with details of 15 male students and 21 female students.

This study, the researcher serves as a teacher collaborating with partner teacher and peers who served as observers and discussion partners during the study. The data collection technique is done through observation, Test, Questionnaire, Interview, Field Records / Daily, Documentation. Then the collected data is processed by analyzing the observation matrix, field notes, the results of the interview, the documentation and calculating the percentage of students' answers in the questionnaire for each given answer using the formula Sudjana (2001, page 19): $P = F / N \times 100\%$.

Then the data is analyzed through the following steps : Data Reduction, Data Display (presentation of data), Conclusing Drawing / Verification (drawing conclusions). In order for the data obtained from the field is valid, then the various ways are done: Member chek, Triangulation, Saturation, Expert Opinion.

III.   RESULT AND STUDY RESULT

1. The results of the ecological intelligence of the students assessment on indicators develop empathy for all forms of life (developing empathy for all forms of life)

In this indicator see the improvement of the attitude of the students in maintaining the environment to be free from garbage problem. The data collection on this indicator is done through the instrument of the questionnaire. The results of questionnaire data that is done on each cycle can be seen in the following graph :
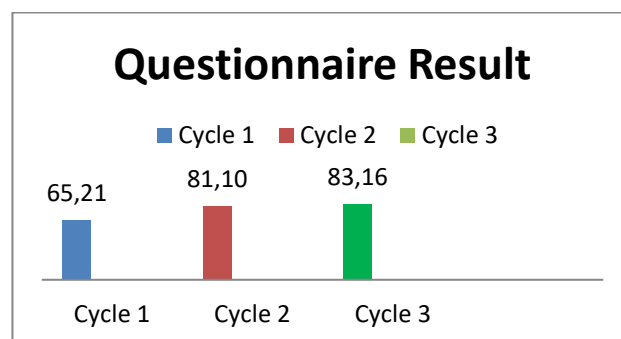

Graph 1 Questionnaire Result

Based on the chart above, the student questionnaire results show the increase in each cycle. In the first cycle, the percentage of the obtained value is 65.21% these results are categorized on the criteria of appraisal enough. In cycle 2, the result of increase from previous cycle shows a significant increase that is 81,10%. In the third cycle shows the increase back from the previous cycle only seen from the percentage is not that significant. The result of percentage in cycle three is 83,16%. The increase from the previous cycle is only 2.06%.

The questionnaire which contains 10 items on the indicator of developing empathy for all forms of life explains that the attitudes of the students toward the environment show good caring.

2. *The observational data of the ecological intelligence of the students on the indicator incorporates sustainability as a group practice (embracing sustainabillity as a community practice), making the invisible visible, anticipating unintended consequences,*

This indicator sees the improvement of the skill of students in utilizing inorganic waste in making flipcharts as a social learning media. Data retrieval on this indicator is done through observation sheet. The results of observations made on each cycle can be seen in the following graph:
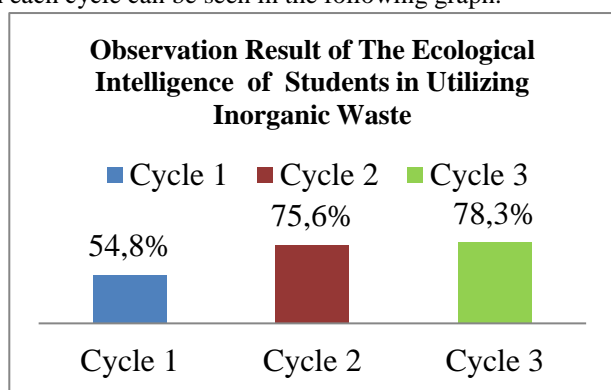

Graph 2 Observation results of students

In the first cycle shows the results with a percentage of 54.8%. In the second cycle the observation result of the ecological intellingence shows a significant improvement. In this second cycle shows the result value with a percentage of 75.6% up to 20.8% compared to the first cycle. In the third cycle it also shows the increasing, this increase is not so significant yet as in the second cycle. In the third cycle shows the results of 78, 3% only increase 2.7% compared to the second cycle.

3. *Data on the results of the ecological intelligence of students assessment on indicator to understand how nature sustains life.*

This indicator sees the increasing in knowledge and comprehension of the students of the ecological intelligence on environmental issues, especially waste. The data retrieval on this indicator is done through the test sheet. This test contains 6 essay questions about the social science material and relates to ecological intelligence. The results of test perform on each cycle could be seen in the following graph:
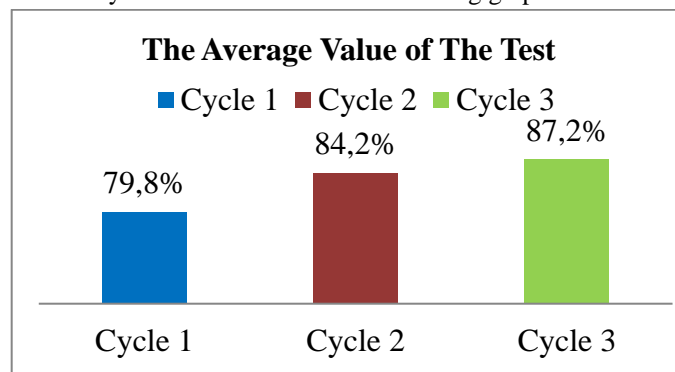
Graph 3 The Average Value of The Test

Based on the graph above, the test results of the students show the increasing results in each cycle. In the first cycle the percentage of the obtained value is 79.8%. In the second cycle test results show a significant increase, obtaining a percentage value of 84.2%. In the third cycle test results show a rebound from the previous cycle it only seen from the percentage is not that significant. The result of percentage in cycle 3 is 87,2%.

IV. STUDY

1. *1. Study on planning of utilization of inorganic waste in making flipchart as social learning media to improve the ecological intelligence of students.*

First, for the continuity of this research, the researchers first contact the subject of the social teacher and colleagues to become observers on the research. Second, determine the competency standard and basic competence of social lesson in accordance with the syllabus of the material to be delivered during the learning process. Third, develop the learning instrument in the form of RPP. Fourth, choose the lesson material that is suitable with the research. Fifth, determine the learning scenario. Sixth, prepare the sources, tools, learning materials that will be needed during the lesson. Seventh, compile the research instrument of data collection. Eighth, plotting a discussion back after the lesson has been implemented. Ninth, make a follow-up improvement plan. Tenth, plan the data processing obtained from the results of research that has been implemented.

The competency standard chosen in cycle 1 is 7. Understanding Indonesian Economic Activities. The selected competencies are 7.1 Describing the problems of the labor force and labor force as a resource in economic activity and the roles of the government in its mitigation efforts. Selection of competency standards for cycles 2 and 3 is 7. Understanding Indonesian Economic Activities. The selected

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competency is 7.2 Describing the economic subjects in the Indonesian economic system.

The material chosen in this research is on cycle 1 covering the employment and unemployment. This material is then combined with unemployment issues that impact on slum patterns. By integrating the material, students are encouraged to be more literate to the problems surrounding environment and how to handle it especially related to waste.

The second cycle material covers the world economic system and the economic system of Indonesia. The material will be linked or linked to the exploitation of the natural environment. By integrating these materials, students are encouraged to understand how the impact of natural exploitation, and other environmental problems.

Cycle 3 material covers taxes, the type of taxes and environmental taxes. This material will then be combined with environmental taxes which purposes are to suppress environmental pollution and natural exploitation caused by the company. By combining the material, students are encouraged to be literate to the environment that anything done by human activities will generate waste.

The learning steps in each cycle are done by 3 actions or 3 meetings. The first meeting explain the social materials combined with the environment to improve the ecological intelligence of the students and then divide the class into 6 groups. The second meeting, students focus on making the product. The third meeting the students present the products made by the group. The next stage after the learning in each cycle is completed, students are asked to fill out questionnaires and questions that have been prepared by the teacher.

2. *Study on the implementation of utilization of inorganic waste in making flipchart as the social learning media to improve the ecological intelligence of the students.*

Social learning according to Sapriya (2009, page 8) explains that social aims to provide students with the opportunity to develop knowledge, skills and values that enable them to become citizens actively participating in a democratic society. One of the social reach is human, place, and environment. Therefore, by having an ecological intelligence, students are expected to be able to understand the surrounding environment to maintain the environment and able to become human being who can live harmoniously with others and the environment.

At each cycle during the lesson, before the *flichart* activity first tearcher presents the material and tasks at the previous meeting. After the flipchart making activities are completed, each group then presents the results at the next meeting. This *flipchart* activity is used as a learning media for students in social learning. The instructional media according to Usman (in Komalasari, 2011 page 27) is media of education that can be used as an intermediary in the learning process to enhance effectiveness and efficiency in achieving teaching objectives. Furthermore, according to Komalasari (2011 age 78) explains the one of the types of social learning media is visual media which include: Images or photos, Sketches, Diagrams, Charts / Charts, Graphs, Cartoons, Posters, Maps and Globe, Board Planel, Bulletin Board. From the explanation that flipchart included in the type of visual media.

In the first cycle the teacher first explains the social material and then at the next meeting each group is asked to make the product. When students are assigned to make flipcharts, there are still many students who are confused about the task given by the teacher. This is because during the first cycle students have not really understood the products they make so that the ecological intelligence indicator can not be fulfilled. This is evidenced by the existence of groups that still use new goods, even though the teacher has told to use inorganic waste or used goods in the manufacture of the product. It shows that students are still low in utilizing the garbage around them. This is also evidenced from the indicators of ecological intelligence that are still in the enough category in the first cycle. After the product has been made at the next meeting each group presents it. While the presentation on this first cycle is still dominated by a few people, not all members of the group speak. In addition to assess the task, researchers also assess the presentation, then set the best group and give rewards to the best group.

In the second cycle, students re-explain about the social material related to environmental issues, then at the next meeting they are asked to make a product of *flipcharts* from inorganic waste. While manufacturing of second cycle product, it has been on good category mean that the experience is increasing. In this second cycle each group is able to make products dominated by inorganic garbage and used-goods garbage. While making the product the teacher guides the students and the observer starts assessing the work of each group. After they finish making the *flipchart,* each group presents the results at the next meeting. Researchers and partner teachers value their group products and presentations, then assign the best groups and reward the group.

In the third cycle, in order to increase the ecological intelligence, students are still given the same task, which is making the product in the form of *flipchart* learning media from inorganic waste. In this cycle the teacher re-fabricate the social material first then at the next meeting was asked to re-create the product. Researchers assess the general product made this cycle better than the cycle 1 and 2. After making the product, each group presents the results. Teachers and observers begin to assess and re-apply the best group to get rewards.

At each cycle, at the end of the action all students are asked to fill out questionnaires and questions to measure the extent to which their success in learning about their ecological intelligence.

3. *Study on the solution of obstacles in the utilization of inorganic waste in making flipchart as the social learning media to improve the ecological intelligence of the students*
The difficulties or constraints experienced by researchers are:

1) Difficulty in determining the appropriate material in the study because it must be adapted to the ongoing competence standards and basic competency.
2) Keep students aware of their surroundings
3) Students are still less able to utilize the existing inorganic waste around them
4) In making flipchart media students still feel confused because the teacher is still less clear in delivering the task of making flipchart media
5) Students have not previously known what flipcharts so it still looks difficult in determining the theme created, so there are still imitating other groups

After conducting discussions and getting guidance from partner teachers and supervisors. The constraints faced can be resolved well. Here are some solutions to deal with these obstacles:

1) Create a systematic learning material to be related to each cycle
2) More often explain environmental pollution problem when explaining IPS material
3) Make other products or learning media based on inorganic waste
4) The worksheets given to each group are redefined, and provide examples of existing *flipchart* media for students to get a picture to make it
5) Teacher guides students to be able to determine other themes that are much more interesting, so as not to fixate on existing examples or other groups

4. **Study on the results of utilization of inorganic waste in the manufacture of *flipchart* as the social learning media to improve the ecological intelligence of the students.**

Ecological intelligence is necessary to be possessed by an individual in carrying out his daily life that is not released from the environment. Goleman (2009, page 38) explains that ecological intelligence allows us to apply what we learn about the effects of human activity on the ecosystem so as to reduce environmental damage and prevent the destruction of the new environment in the earth.

The result of improvement of ecological intelligence through the utilization of inorganic waste in making *Flipchart* learning media in each cycle is as follows:

Cycle 1, the average percentage of the ecological intelligence of students in utilizing inorganic waste through the learning media in the form of *flipchart* on social science learning reached 66.6% or it can be categorized in the criteria of appraisal enough. The description of the average hail percentage is on the indicators of developing empathy to all forms of life (developing empathy for all forms of life) that is equal to 65.21%. Indicators bring together sustainability as a community practice, making the invisible visible, anticipating unintended consequences, the three indicators getting a 54.8% percentage. The indicators understand how nature sustains life (understanding how nature sustains life) of 79.8%.

Cycle 2, the average percentage of the ecological intelligence of students in utilizing inorganic waste through the learning media in the form of flipchart on social science learning reached 80.3% or categorized in good assessment criteria. These results indicate that ecological intelligence has increased significantly from the previous cycle increased by 13.7%. The improvement shows that the ecological intelligence of students can be improved in social lessons ranging from knowledge, attitudes and skills of students or from student discovery problems, problem solving by students, to practice in changing lifestyles that safeguard the environment. As expressed by Peduk Rintayanti (in Falupi, 2016 page 159) that "... the empathy of the surroundings of the people of Surakarta city of Central Java can be enhanced by enhancing cognitive ability, cultural values, and lifestyle." Apart from the results of data analysis obtained, it also sees that the class condition has started clean and students started accustome to collecte garbage and dump garbage in the appropriate place. The description of the average percentage of cycle 2 that is in developing empathy to all life forms (developing empathy for all forms of life) that is equal to 81,10%. Indicators integrate sustainability as a community practice, making the invisible visible, anticipating unintended consequences, the three indicators getting 75 percentage points, 6% Indicators understand how nature sustains life (understanding How nature sustains life) of 84.2%.

The increase occurred again in cycle 3, but the increase does not look significant. The average percentage obtained by students in utilizing inorganic waste through making the learning media in the form of flipchart as the social learning is 82.8% or categorized in good cryteria. The increase from the previous cycle is only 2.5%. The description of the average result is on the indicators of developing empathy for all forms of life (developing empathy for all forms of life) of 83.16%. Indicators bring together sustainability as a community practice, making the invisible visible, anticipating unintended consequences, the three indicators getting a 78.3% percentage. The indicators understand how nature sustains life

(understanding how nature sustains life) of 87.2%. The results of data analysis on this 3rd cycle researchers obtained data that has reached the saturated data, the data shows an increase but the increase does not look significant. Therefore, in this 3rd cycle the study is discontinued and it can be said that grade VIII-B students have achieved good ecological intelligence in the utilization of inorganic waste. It can be seen that the increase shows that the research done successfully and reached the point of success reached 76.5%.

CONCLUSION

First, at the planning stage for the continuity of the research, the researchers contact the social teacher and colleagues to become observers on the research, determining SK / KD and materials, preparing RPP. Formulate learning tools and materials, formulate scenarios, collect data retreival research instruments, plan reverse discussions after lessons are learned, create follow-up improvement plans, plan data processing obtained from the results of the research already undertaken.

Second, In the implementation stage, the researchers perform 3 cycles and each cycle the researchers perform 3 actions. Activities performed on any action on the first cycle is different, in the first cycle carried out three acts, the first act of the students were given an explanation of the social material then linked to the intelligence of the ecological, the first cycle of the material presented is of unemployment associated with slum areas, the second action which done is creating a task group of students with flipchart form-based inorganic material related types of unemployment, the third action group presented the results flipchartnya. These three activities of action will be repeated in the next cycle. In the second cycle, the first act is explaining material about the economic system which is then linked to the exploitation of nature, the actions of both students and groups make flipchart from inorganic material related economic subjects, the third action group is presenting their flipchart results. In Cycle three, the first act is explaining the material about taxes then linked to environmental taxes and environmental pollution, the actions of the two students together with the group create a flipchart made from inorganic waste related to the type of tax material, the action of the three groups represent the result of the flipchart. At the time of conducting the research activity took place the observer began to assess all the ongoing teaching and learning activities including the student task assessor.

During the course of research activities certainly can not be separated from the constraints. The difficulties or constraints experienced by researchers are: 1) Difficulty in determining the right materials in the study because it must be adjusted to the standards of competence and basic competence in progress. 2) Keep students aware of their surroundings. 3) Students are still less able to utilize the existing inorganic waste to be diluted around them. 4) In making flipchart media students still feel confused because the teacher is still less clear in delivering the task of making flipchart media. 5) Students have not previously known what flipchart sehigga still looks difficult in determining the theme created, so there are still imitating other groups. After conducting discussions and getting guidance from partner teachers and supervisors. The constraints faced can be resolved well. Here are some solutions to deal with these obstacles: 1) Create a systematic learning material to be related to each cycle. 2) Frequently explain environmental pollution problems when explaining IPS materials. 3) Make other products or learning media based on inorganic waste. 4) The worksheets given to each group are re-explained, and provide examples of existing flipchart media for students to get a picture to make them. 5) The teacher guides the students to be able to determine other themes that are far more interesting, so as not to fixate on existing examples or other groups.

Fourth, the results of this study in each cycle increased. In cycle 1, the average percentage of the ecological intelligence of students in utilizing inorganic waste through making the learning media in the form of flipchart on social studies learning reaches 66.6% or can be categorized in the criteria of appraisal enough. Cycle 2, the average percentage of the ecological intelligence of students in utilizing inorganic waste through making the learning media in the form of flipchart on social studies learning reached 80.3% or categorized in good assessment criteria. These results indicate that ecological intelligence has increased significantly from the previous cycle increased by 13.7%. The increase occurred again in cycle 3, but the increase does not look significant. The average percentage obtained by students in utilizing inorganic waste through making the learning media in the form of flipchart as the social learning is 82.8% or categorized in good judgment. The increase from the previous cycle is only 2.5%. The results of data analysis on this 3rd cycle researchers obtained data that has reached the saturated data, the data shows an increase but the increase does not look significant. Therefore, in this 3rd cycle this study is discontinued and it can be said that grade VIII-B students have achieved good ecological intelligence in the utilization of inorganic waste. It can be seen that the increase shows that the research done successfully and reached the point of success reached 76.5%.

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