Development Of Physic Learning Instruments Using Cooperative Learning Model STAD Type With ARCS Model To Improve Student's Creative Thinking Skills In Senior High School

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Abstract- This research aims to developing of physic learning instruments using cooperative learning model STAD type with ARCS model to improve student's creative thinking skills in senior high school. This research is developmental research aimed at developing learning instruments that will then be implemented in class. The research design used in the study uses a 4-D development model. Learning instruments developed include syllabus, lesson plans (RPP), student handouts, student worksheets (LKS), creative thinking assessment instruments. The sample of this research is a physics learning instuments using cooperative learning model STAD type with ARCS model to improve student's creative thinking skills in senior high school on static fluid material taught to 90 students class of X in the Antartika High School Sidoarjo academic year 2018/2019 who have never received learning using cooperative learning models STAD type with ARCS model. This research consists of 2 stages, namely the first stage of developing learning instruments, and the second stage is testing the learning instruments. Data collection techniques from this research were observation, tests, and quiestionaire. Based on the results of research and discussion. Physic learning instruments using cooperative learning model type STAD with ARCS model developed has met the reuirements of validity, practicality, and effectiveness, so it is appropriate to be used to improve student's creative thinking skills.

Index Terms- Development of Physic Learning Instruments, Cooperative Learning Model STAD Type, ARCS Model, Student's Creative Thinking Skills

I. INTRODUCTION

Physics is a part of science that deals with phenomena and behavior nature, which is observed by humans. The curious nature of students needs to be stimulated, grown and maintained as well as possible. Physics is science experiments, so by conducting experiments students not only understand and mastering concepts, theories, principles, and physical laws, but students also apply scientific methods.

The teacher has more role as a facilitator and motivator in learning. The main principle of active learning is the mental-intellectual and emotional involvement of students in each learning process which is by the view of cognitive learning theory. Then due future challenges require more developed learning creative thinking skills included in High Order Thinking (HOT). Creative thinking is one of the human intellectual abilities very important because it is included in the ability to solve problems [1]. Creative thinking is easily realized in the learning environment which directly provides opportunities for students to think openly and flexible without fear or shame, so that related to student activities. Student learning activities so far tend is individualistic, meaning students are trying to understand and solve the problem is based on the perspective and the results of one's thinking. That matter leads to student learning gaps marked by absence interactions between individuals. Students in learning less get input knowledge from more capable friends. This situation is what causing difficulties and even failure of students, even more so for low ability students.

Based on the results of interviews with physics teachers at Antarctic Senior High School Sidoarjo, it is known that there are no teachers who do learning and assessment for creative thinking skills. The results of the pre-research study were tested creative thinking skills in students known to 10% of students complete in creative thinking skills. The low percentage of students completeness in the test creative thinking skills are caused by several factors. The teacher said the absence of adequate media facilities and the complexity of the assessment that must be done is an obstacle experienced. Arrangement of learning instruments by practicing creative thinking skills will make students accustomed to develop or find original, authentic, and original ideas constructive which are directly related to the concept view and emphasizing aspects of intuitive and rational thinking [2]. Through this learning, students realize the importance of physics in mastery of science and technology in everyday life.

Students need to develop creative thinking as well solving problems related to student life [3], so we need a learning model that encourages students to be good and creative thinkers, who can provide many alternative answers to a problem. The learning environment

that is formed must be facilitate discussion, encourage students to express their opinions and creative ideas. Such learning situations can be realized through cooperative learning.

Piaget and Vygotsky emphasize the social nature of learning, both of which suggest using study groups with the ability of diverse group members to work on power change in the understanding of learning [4]. Expected learning atmosphere as above will we get in the cooperative learning model. Cooperative learning model there are various models of approach but in this case can develop creative thinking, namely the Student Teams Achievement Division (STAD) is cooperative learning in which heterogeneous teams interact with each other help one another, learn by using various methods cooperative learning and quiz procedure. Theories that support the cooperative learning model STAD type includes constructivist theory, Piaget's cognitive theory development, and Vygotsky's social theory. According to Piaget, optimal education requires experience challenging for students so that the process of assimilation and accommodation can be produce intellectual growth. The cooperative learning model STAD type can influence the creative thinking skills of class students XI High Schools in Wajo Regency, South Sulawesi, with the category "medium", [5] about the profile of creative thinking abilities and cognitive learning achievement in middle school students with cooperative learning STAD type concluded that the results student's learning and creative thinking skills have increased considerably. The effect of cooperative models STAD type with the SETS approach concluded that there was a significant effect on critical thinking skills and learning achievement [6] and the effect of the STAD cooperative learning model and Think Pair Share (TPS) concluded that the STAD type cooperative learning model can improve creative thinking skills better than models Think Pair Share (TPS) learning [7].

Meanwhile, to optimize and become support in teaching cooperative models STAD type then the ARCS model to increase student motivation which is aligned with the steps cooperative learning STAD type. ARCS model can improve student's creative and critical thinking skills with the category "medium" [8]. ARCS motivation strategies on inquiry models can improve student's higher-order thinking skills with the category "medium" [9] and regarding the application of motivational strategies ARCS concludes that managing ARCS motivational strategies improves learning achievement and student learning activities [10]. The development of teaching materials on integrity is done by integrating overall competence. Static fluid material was used in this study because the material has a concept of physics that is quite broad and can explain the phenomena that occur around such as a hydraulic system, submarine work systems and so on. It is expected that students can make discoveries or new ways that are the result of creative thinking skills.

Based on the above description the researcher intends to develop cooperative learning model STAD type with ARCS model to improve student's creative thinking skills on Static Fluid Material in Class X High School and apply it to physics as a solution the implementation of learning in the Antarctic High School Sidoarjo

II. EXPERIMENTAL METHOD

2.1 General Background of Research

This research is developmental research aimed at developing learning instruments that will then be implemented in class. The research design used in the study uses a 4-D development model. Learning instruments developed include syllabus, lesson plans (RPP), student handouts, student worksheets (LKS), creative thinking assessment instruments. This research was conducted at the Antartika High School Sidoarjo in the Even Semester, academic year 2018/2019. The school was chosen as a place of research because the school was open to efforts to improve the quality of learning, and the availability of adequate supporting facilities and infrastructure.

2.2 Sample of Research

The sample of this research is a physics learning instuments using cooperative learning model STAD type with ARCS model to improve student's creative thinking skills in senior high school on static fluid material taught to 90 students class of X in the Antartika High School Sidoarjo academic year 2018/2019 who have never received learning using cooperative learning models STAD type with ARCS model.

2.3 Instrument and Procedures

This research consists of 2 stages, namely the first stage of developing learning instruments, and the second stage is testing the learning instruments class of X in the Antartika High School Sidoarjo academic year 2018/2019.

2.4 Data Analysis

a. To find out the validity of the learning instruments, the data analysis of the learning instruments validation was done in a qualitative descriptive manner which included: lesson plans, student worksheets, student books, and creative thinking instruments. The data obtained were analyzed using the average score of each aspect. The scoring results are described as follows.
   $1.00 \leq SVP \leq 1.50$: Not suitable and cannot be used yet.
   $1.51 \leq SVP \leq 2.50$: Not appropriate and can be used with many revisions.
   $2.51 \leq SVP \leq 3.50$: Feasible and can be used with minor revisions.
   $3.51 \leq SVP \leq 4.00$: Very feasible and used without revision [11]
   The instrument's reliability level is calculated by the formula:

$$R = \left(1 - \frac{A - B}{A + B}\right) x100\%$$

   Information:
   R = reliability
   A = frequency aspect which gives a high frequency
   B = frequency aspect which gives a low frequency
   The reliable instrument if the reliability coefficient ≥ 75%

1) Validity of RPP. Data analysis of the validity of the RPP components was carried out with a qualitative descriptive method by averaging the scores of each component. This validity is carried out by validators who are competent in their fields.
2) Validity of BAS. The validity of BAS was analyzed descriptively qualitatively which included the feasibility of the content, linguistics, and presentation carried out by the validator, then the scores given were averaged in the same way as the analysis of the validity of the RPP.
3) Validity of LKS. The validity of the worksheet was analyzed descriptively qualitatively covering the format, language, and content carried out by the validator, which was then given a score and a feasibility category.
4) The validity of the Creative Thinking Skills Test. The validity of the creative thinking skills test was analyzed descriptively qualitatively. The results of the analysis of creative thinking skills test data are elaborated with qualitative descriptive which includes the validation of the questions, the language, and writing of the questions, and the conclusions made by the validator which are then given a score and a feasibility category.
5) BAS Readability. Validity data obtained were analyzed by descriptive qualitative. The results of the analysis of the readability of students' textbooks are elaborated with descriptive qualitative. The calculation of readability uses the following formula.

$$K_b = \frac{k}{\Sigma k} x100\%$$

Information:
K_B = readability level
k = frequency of words that can be read
Σk = the total number of words that must be read
The calculation result is more than 75%, then the text category is easy or has high readability, if the result is between 20% - 75%, then the text category is medium or reads moderately, and if the result is less than 20% then the text category is difficult or has low readability.

b. To find out the practicality of a static fluid learning instrument developed through a cooperative model with the ARCS approach, the learning achievement data is analyzed descriptively with qualitative and inferential statistics as follows.
1) Learnability
Analysis of the feasibility of learning conducted by two observers who have been trained to understand the observation sheet correctly, then the feasibility data is processed in quantitative descriptive statistics. The assessment is done by putting a checkmark (√) in the performance column which consists of "yes" or "no" choices and in the assessment column which consists of 4 criteria, namely: very good, good, not good, and not good. Data analysis techniques can be calculated using the following equation.

$$P = \frac{\Sigma K}{\Sigma N} x100\%$$

Information:
P = percentage of feasibility
ΣK = number of aspects implemented
ΣN = the sum of all aspects experienced [12]
Implementation Criteria: 0% ≤ P ≤ 24%: not implemented, 25% ≤ P ≤ 49%: less implemented, 50% ≤ P ≤ 74%: well done, 75% ≤ P ≤ 100%: very well implemented

c. To find out the effectiveness of static fluid learning tools developed through a cooperative model with the ARCS model, analysis of the effectiveness of learning instruments is used as follows.
1) Creative Thinking Skills Test
Student's creative thinking skills test data were analyzed using qualitative descriptive analysis to obtain the value of student's creative thinking skills. The results of the analysis of creative thinking skills test data are elaborated with descriptive qualitative. The value of students' creative thinking skills is obtained by the formula:

$$creative\ thinking\ skill = \frac{total\ score\ obtained}{total\ score} x100\%$$

Creative thinking skill criteria: 81,6% - 100%= very creative, 61,2% - 81,5% = creative, 40,8% - 61,1% = quite creative, 20,4%-40,7% = less creative, 0,0% - 20,3% = not creative [13]
a) Homogeneity Test
Homogeneity is used to test the effect of both homogeneous data by comparing the two variations, while this study aims to examine the effect of data obtained by homogeneous or heterogeneous variance. To test homogeneity can be calculated using SPSS 22.0 for Windows, with the following criteria:
- The value of sig. or the significance or probability value <0.05 then the data have non-homogeneous variants.
- The value of sig. or significance or probability value> 0.05 then the data has a homogeneous variant.
b) Normality Test
The normality test in this study is used to test the effect of data that is used as research material with normal distribution or not. Calculation of normality tests can use the Kolmogorov Smirnov test with the help of SPSS 22.0 for Windows with the following criteria:
- The value of sig. or the significance or probability value <0.05 then the data are not normally distributed.
- The value of sig. or significance or probability value> 0.05, then the data are normally distributed.
c) Hypothesis Test
After the prerequisite tests for homogeneity and normality, the hypothesis test is then performed. The hypothesis test used is

the Two Way Anova parametric statistics, the analysis often referred to as the multiple ANOVA is a parametric statistical technique used to test differences between data groups of two or more independent variables. In this study, there are 2 independent variables, namely pretest, and posttest and class groups, and then one dependent variable is the results of the creative thinking skills test. ANOVA Two Path Test is used using SPSS 22.0 for Windows. After analysis comparing the significant values obtained, if ≤ 0.05, it can be concluded that there is an influence. In addition to SPSS 22.0 for Windows, calculating ANOVA two paths can be done manually. The steps to determine the price of two-way ANOVA are as follows:

- Determine the hypothesis
  1. Ho: There is no effect of the cooperative learning model with the ARCS model on the creative thinking skills of high school students.
     H1: there is an influence of the cooperative learning model with the ARCS approach on the creative thinking skills of high school students.
  2. Ho: there is no class effect on high school student's creative thinking skills.
     H1: there is a class effect on high school student's creative thinking skills.
  3. Ho: there is no effect of the cooperative learning model with the ARCS and classroom approaches on the creative thinking skills of high school students.
     H1: there is an influence of the cooperative learning model with the ARCS and classroom approaches on the creative thinking skills of high school students.
- Calculate the total number of squares (JKt), between A (JKa), between B (JKb), interaction A x B (JKab) and within the JKd group.
- Calculate the degree of total freedom (dbt), between A (dba), between B (dbb) interactions A x B (dbab).
- Calculate the average of the squares between A (Rka), between B (Rkb), interaction A x B (Rkab), and in groups (Rkd).
- Calculate the ratio of Fa, Fb and Fab
- Test the significance of all prices F
  If Fcount ≥ Ftable (significant) with the numerator db and the denominator db that has been obtained in the calculation and if the significance is ≤ 5% then H1 is accepted and reject Ho.

d) N-gain
After ascertaining that the learning tools used have a positive impact on the results of students' creative thinking skills through t-test then the data is analyzed with N-Gain. The use of this technique is used to find out the magnitude of the increase in creative thinking skills of each student which is indicated by the value of G (normalized gain) and with the following formula:

$$< g > = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}}$$

With
<g> = gain score
S_{post} = post-test score
S_{pre} = pre-test score
S_{max} = maximum score

2) Student Response Questionnaire.
Student responses were analyzed descriptively with presentations using the formula for calculating student responses as follows.

$$P = \frac{\Sigma K}{\Sigma N} x100\%$$

Information:
P = Percentage score of student responses
ΣK = Number of students who chose answers
ΣN = Number of all students

III. RESULT AND DISCUSSION

Validated learning instruments consist of lesson plans, handouts, worksheets, and learning achievement tests. The results of the RPP validation compiled have a very valid category and can be used with a little revision (average score 3.72). The reliability of the RPP is 96.22%, so the results of the RPP validation prepared can be used. The aspects assessed in the RPP include identity, goals, methods, facilities and learning resources, learning steps, evaluation, and readability. However, for the sake of perfection of the RPP, there is little advice from the validator. In Table 4.2, the first suggestion given is that there is no reference explanation from the K-13 based books, practicum activities are dominated by teachers, and writing numbering of Indicators is adjusted to Basic Competence (KD). The learning process applied is cooperative learning models with the ARCS approach. The material presented is Static Fluid. The Learning Implementation Plan (RPP) compiled by researchers is used as a guide for carrying out the learning process in the classroom.

The worksheet validation results explain that have a very valid category and can be used with little revision (average score of 3.77) with the reliability of 98.12%. The aspects assessed from the worksheet include the worksheet format, content suitability, and language. From all aspects assessed, the average score was very valid. However, for the sake of perfection worksheets, from the validator, there is a little suggestion that is the addition of Working Drawings on Worksheet 02. After the worksheet is corrected by the validator's suggestion, then the learning instrument LKS can be used in the learning process. Student Activity Sheet (LKS) is a guide for students to make

observations, practicums, clarify understanding, discover and apply existing concepts done in groups or independently. The use of worksheets is also expected to facilitate students in the learning process, especially to train students' creative thinking abilities.

The results of the validation of the Handouts for students show that have a valid category and can be used with little revision (average score of 3.65) with the reliability of 92.73%. The aspects assessed from the Handout for students include the organization of sub-concepts, the contents, characteristics, and the elaboration of concepts. From all aspects that were judged to obtain a valid average score results. However, for the sake of the perfection of the student book, from the validator there is little suggestion that the information in the picture is improved and as well as the reference writing the equation formula. After the Handout for students is corrected by the validator's suggestion, the student's learning kit can be used in the learning process.

The results of the validation of the learning outcomes test in Table 4.5 show that the results of the validation of the test results of the learning achievement compiled have very valid category but have moderate reliability. This problem can be used with revisions so that it is feasible to use in the learning process. Learning outcomes test consists of pre-test questions, and post-test questions that are made concerning the basic competencies to be achieved then elaborated into indicators of achievement of learning achievement and are arranged based on a grid of questions complete with key answers. Suggestions given by the validator include: learning objectives in pre-test and post-test, revision of answers to questions in pre-test and post-test number 6, and learning objectives are too many, it is better to be chosen so that they are not too many. After the learning achievement test is improved according to the validator's suggestion, the learning achievement test can be used in the learning process.

Based on that, in general, the implementation of the RPP has an average score of 3.8 which has a very good category. The reliability of RPP implementation is 88%, which means that RPP implementation is categorized as very good because the reliability value is ≥ 75% so that it can be used in the learning process. This shows that in the implementation of physics learning using cooperative learning models with the ARCS approach can be categorized very well. Cooperative learning model STAD type consists of the following learning activity cycles 1) Class presentations, 2) Group activities, 3) Tests / Discussions, 4) Calculations of individual development scores, and 5) group awards. Then the cycle is arranged by the researcher to adjust to the ARCS model, including the Preliminary Phase ie the teacher conveys the learning objectives and related learning material, the Core Activity Phase ie the teacher gives a pretest which is then used as a guideline to divide the group heterogeneously and work on the worksheet and then the Concluding Stage The teacher conducts group discussions, provides posttests and rewards for groups that have a high increase in group scores. In class X IPA 1, the preliminary stage in learning based on the ARCS model has an average score of 3.7, whereas in class X IPA 2 and X IPA 3, respectively indicate an average score of 3.7 and 3.8 which have categories very good. The preliminary stage in learning has an average score of 3.8 with a very good category. This means that the teacher has implemented the learning well including the delivery of apperception and motivation, the delivery of goals, and advance organizers using physical phenomena around students so that the impact on student enthusiasm when participating in learning. Advance organizer with physical phenomena around students conducted by the teacher is proven to stimulate student knowledge related to the material to be taught. The core activities of class X IPA 2 get an average score of 3.6, whereas in class X IPA 3 and X IPS 2, respectively get an average score of 3.8 and 3.7 with a very good category to get an average score averaged 3.7 in the excellent category. At the first meeting, students are still confused with practicum activities because they have never participated in learning with practicum so the teacher must guide slowly the stages of practicum to students. In general, the core activities went well. The closing stage gets a very good average score while time management gets a good average score. Time management at the first meeting is a bit disrupted because the teacher has to adjust the time of one lesson that is not by the learning design. Students and teachers seem enthusiastic about implementing learning. The teacher can liven up the classroom atmosphere, so the class becomes fun and general the implementation of RPP have very good category.

Student's creative thinking abilities are measured by doing a creativity test. The questions of creative thinking are in the pre-test and post-test questions. The problem of creative thinking is 5 questions. Each question contains all four indicators of creative thinking ability measured (fluency, flexibility, originality, and elaboration). Creative thinking is a habit of the mind that is trained by paying attention to intuition, animating the imagination, expressing new possibilities, opening amazing perspectives, and generating unexpected ideas (Johnson, 2010). Based on this opinion, the ability to think creatively needs to be trained so that students can use their creative abilities to solve a problem with many possible solutions. The results of the creative thinking test of students of X IPA 1 average pre-test of 28.23 with less creative category, X IPA 2 average of pre-test of 20.88 with less creative category, and X IPA 3 pre-test average of 20.88 with less creative categories. This is because, most students have not been able to come up with diverse ideas, so many students find it difficult. After participating in cooperative learning models with the ARCS model and trained in creative thinking skills, X IPA 1 average post-test of 82.56 with creative categories, X IPA 2 average post-test of 84.35 with creative categories and X IPA 3 average post-test average of 81.77 with the creative category. This is because students have started to get used to working creatively, fluently in issuing ideas, issuing lots of correct ideas, and being able to design practical designs well. The results of the achievement indicators of creative thinking ability can be seen in Table 4.8, the highest increase seen in fluency indicators with an increased score of 0.91 (high) in Class X IPA 2 and the lowest in Class X IPA 1 with an increased score of 0.88 (high). This is because students start fluently in writing ideas in answering the given problems. In learning cooperative models with the ARCS model, students are trained to smoothly relate a concept to the phenomena around it, so that these abilities can be used when solving a problem. The flexibility indicator increased by 0.80 (high) in class X IPA 2 and the lowest in class X IPA 1 increased by 0.74 (high). This is because, during learning of the cooperative model with the ARCS approach, students are trained to develop many ideas with different points of view in answering a problem. Indicator of authenticity (originality) increased by 0.76 (high) in class X IPA 2 and the lowest in class X IPA 1 increased by 0.72 (high). Despite having a moderate increase, students are considered to still less able to come up with original ideas when questioning is done directly, but in writing in the post-test students can come up with unusual ideas. The elaboration indicator increased by 0.75 (high) in class X IPA 2 and the lowest in class X IPA 1 with X IPA 3 an increase of 0.70 (high). This can be seen from the students' answers that began in detail by giving specific details on each idea given. In cooperative learning models with the ARCS model, students are also trained to detail the functions and

usefulness of practical tools and materials. In general, all indicators of creative thinking ability have increased in the medium category.

Description of the average value between the test scores of creative thinking skills in the pre-test and post-test of Natural Sciences X-1, Natural Sciences X-2 and Natural Sciences X-3, tested by SPSS using the two way ANOVA test, first the data was tested on the level of normality of data above sig> 0.05, it can be said that the pretest and posttest values are normally distributed, also using the homogeneity test that the value data is above the sig value. > 0.05 then all the data tested are homogeneous, so it can be said that the pretest and posttest values have met the prerequisite tests, namely the normality test and the homogeneity test. After the two-way ANOVA test is obtained: 1) Tests of Between-subjects Effects show the learning model with a significant value Corrected Learning model is 0,000, then 0,000 <0.05, H0 is rejected. So it is concluded that there is an influence of cooperative learning model learning model with the ARCS model to improve student's creative thinking skills in senior high school. 2) At the PROPOS value the significance level of the pre and post-test group level was 0,000, then 0,000 <0.05, H0 was rejected. So it was concluded that there was an influence of the level of pre-test and post-test scores on the creative thinking skills of high school students. 3) In the CLASS Values, Inter-Level Class X IPA 1, X IPA 2 and X IPA 3 is the significance value of cooperative learning model STAD type with ARCS model is 0.639, then 0.639> 0.05, H1 is rejected. So it was concluded there was no difference in value (there was a similarity in value) the effect of cooperative learning model with the ARCS model and the level of Science Class X of the Antarctic High School Sidoarjo on the subject of Static Fluid. These results support Bruner's theory which suggests that students should learn through active participation with concepts and principles so that they gain experience and conduct experiments that allow them to find their principles.

Student learning achievement are measured by conducting a test of learning achievement. Learning achievement tests are given at the time of the pre-test and post-test. The learning achievement test consists of 10 multiple choice questions and 5 descriptive questions which include creative thinking questions. In class X IPA 1 shows the results of the pre-test on average of 29.17 and post-test of 81.9 while class X of IPA 2 shows the results of the pre-test on average of 35.67 and post-test of 86.73 then class X Science 3 shows the results of the pre-test on average of 29.33 and post-test of 83.43 with the number of students who did not complete in class X Science 1 as many as 1 student, X science 2 as many as 4 students, and X Science 3 as many as 3 students. Based on these results student learning outcomes have increased with an average gain value of 0.74 which is categorized high for the three classes. The concept of static fluid is the initial material given in class X although previously it was also given during middle school, so students still have difficulty in remembering the material to answer the questions given in the pre-test. Before being given cooperative learning models with the ARCS model, students have indeed not been given exercises of creative thinking questions, so when given creative thinking questions, students are still confused in answering the questions given. The cooperative learning model with the applied ARCS model can help students in understanding concepts and practicing creative thinking skills so that when working on a post-test, students can smoothly answer the questions given. Improving student learning achievement is also supported by the practice questions in the Handout for students. Students are also challenged to work on creative questions so that they are increasingly trained in developing student's creative thinking abilities which have an impact on increasing learning achievement. Based on the description of student learning achievement it can be concluded that cooperative learning models with the ARCS model can improve student learning achievement.

The skill aspect is related to student's motor skills. Aspects of skills are measured when students do practical activities. The assessment instrument was in the form of student skills observation sheets which included; prepare tools and materials, assemble sets of practicum, do a practicum, record the results of practicum, answer worksheets, and tidy up practicum tools. Based on Table 4.10, the average score of the aspects of the skills of students in class X IPA 1 is the average A- predicate, X IPA 2 is the average A- and X IPA 3 average A-predicate. This is because students do not often do practical activities before, so in the first practicum students are still confused with the steps in the worksheet. Skills in using tools also must still be guided by the teacher. The skills of students in the second and third practicum have experienced development. Seen when assembling the experiment set, students can immediately apply it after reading the worksheet. With practical activities, students can also practice their creative thinking skills in problem-solving.

Student responses are responses given by students after participating in learning. Student responses were measured using a student questionnaire response instrument. Students are asked to fill in a questionnaire containing opinions and assessments of the implementation of learning and its supporting components which include; interest in the learning component, the novelty of the learning component, difficulties in learning, and the learning methods applied.

Based on Table 4.13, overall the learning that has been carried out has received positive responses with a percentage of 92.14%. This can also be seen from the enthusiasm of students in the following learning by Ausubel theory learning must build understanding in its cognitive structure, and learning must be a meaningful part of solving life problems (Nur, 2008). From the aspect of student interest, it was obtained X IPA 1 of 93.28%, X IPA 2 of 93.75% and X IPA 3 of 95.97% of students expressed interest in the implementation of learning and its supporting components. Students are interested in the Handouts for students created by researchers because they are easy to understand and have many creative questions in them.

In the aspect of the novelty of learning, the students' response X IPA 1 is 93.63%, X IPA 2 is 93.75% and X IPA 3 is 96.77% stating that the learning that has been done is new, both in terms of learning and from its supporting components. Practicum activities and teacher teaching methods are considered as something new for students because they have never been given such learning.

Student responses to the aspects of the difficulty of students X Natural Sciences 1 by 89.71%, X Natural Sciences 2 by 89.38% and X Natural Sciences 3 by 89.68% of students stated not difficult. Students still find it difficult to work on count problems in class X IPA 2 (10.62%). This can be seen in the test results given, only a few students who can do the calculation problems correctly. Then students should also need to be taught count problems that are easily understood by students.

In the aspect of learning methods applied, X IPA 1 of 93.53%, X IPA 2 of 93.30% and X IPA 3 of 91.61% of students said they liked the learning done. Students prefer to be explained by the teacher directly than to find themselves. Students still find it difficult to find their concepts, so they still need to be trained continuously about the method of discovery. Students also prefer to be given creative problem solving because it can train students' creative thinking abilities. Overall, students responded positively to the learning of cooperative physics

models with the ARCS approach.

IV. CONCLUSION

Based on observations of the data obtained, calculation analysis and discussion of the results of research on the development of instruments and the application of cooperative learning models with the ARCS approach found the following matters: 1) Learning instruments developed include lesson plans, handouts for students, student worksheets, and learning achievement tests that are of good quality so that they are valid as a learning tool with slight revisions in the teaching and learning process. 2) The implementation of the physics learning process on static fluid material has been carried out with a very good category. 3) Description of the effectiveness of the application of cooperative learning models with the ARCS model. This is seen from several aspects, namely: a) Student learning achievement X IPA 1 has increased with an average gain value that is categorized high, X IPA 2 has increased with an average gain value categorized high and X IPA 3 has increased with an average gain value that is categorized high. b) The average score of the aspect of skills obtained by students is the average score of the aspect of skills of students in class X IPA 1, the average grade of A-, X IPA 2, the average value of A- and X IPA 3, the average grade of A-. c) Students creative thinking test X IPA 1 average pre-test category less creative and post-test creative category while students creative thinking test X IPA 2 average pre-test category less creative and post-test creative category then test creative thinking student X IPA 3 average pre-test category is less creative and post-test is a creative category. d) There is an influence of the cooperative learning model with the ARCS model to improve student's creative thinking skills according to the Test of Between-subject Effect. e) There is no difference in values (there are similarities in values) the effect of the cooperative learning model with the ARCS model on the third grade of high school by the Two Ways Anova results. f) Student responses to learning cooperative models with the ARCS model show a positive response. 4) Description of the obstacles encountered in the implementation of learning, among others; allocation of learning time, students' initial knowledge of the material, and constraints during practicum. These obstacles can be overcome by the teacher by conducting guidance, supervision, and control of each activity carried out by students.

Physic learning instruments using cooperative learning model type STAD with ARCS model developed has met the reuirements of validity, practicality, and effectiveness, so it is appropriate to be used to improve student's creative thinking skills.

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