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International Conference on Mathematics and Science Education of Universitas Pendidikan Indonesia Volume 3, 2018 | P-ISSN 2655-2361, E-ISSN 2655-3252 152  
<http://science.conference.upi.edu/proceeding/index.php/ICMScE/issue/view/3> | ICMScE 2018 The Development of Worksheets IPA with Cognitive Conflict Strategy to Reduce Misconception in Heat Material Heny Ekawati Haryono, Nisaul Barokati Selirowangi, Khafidoh Nurul Aini Program Studi Pendidikan Matematika, Universitas Islam Darul Ulum Lamongan, Jl. Airlangga 03 Sukodadi Lamongan, Jawa Timur 62253, Indonesia henny@unisda.ac.id Abstract. This study aims to analyze the feasibility of LKS IPA with cognitive conflict strategy, that has been developed to reduce misconceptions Heat material.

This research includes the development of research which refers to the 4-D models by Thiagarajan. The Samples are 50 students of SMP Negeri 1 Lamongan. The design of the study is one group pretest-posttest design implemented in a single group without a comparison group. Research instrument used in the form of validation sheets, observation sheets, and diagnostic tests misconceptions.

The misconceptions identification can be done by individuals or groups using Certain of Response Index (CRI). Techniques to determine the improvement of learning outcomes in this study using techniques normalized gain  $\langle g \rangle$ . Data analysis is the initial diagnostic test (pretest) aims to identify the concepts that experienced student misconceptions, while the end of the diagnostic test (posttest) aims to determine the effectiveness of IPA LKS cognitive conflict strategy in overcoming misconceptions. The result shows the depression of misconceptions.

The decline of students misconceptions after study shows that the development of LKS

IPA with cognitive conflict strategy provides a good contribution in reducing students' misconceptions. Based on the understanding of the concept of positive student learning outcomes indicate that happens to change, the use of LKS IPA with cognitive conflict strategy contributes improve students' conceptions in line with the findings. 1.

Introduction Learning in the classroom is always involves interaction with other students.

Cooperative learning process through mutual interaction encourages the exchange of information and knowledge among students. In other words, the process of learning as it is changing the teacher-centered learning (teacher-centered learning) becomes active student-centered learning (student-centered learning).

In addition, the cooperative learning model is expected as well as an alternative learning that trains students to express opinions verbally and develop patterns of thinking skills. Learning is good and true physics assist in the formation of character and personality of students through the development of positive attitudes of students as follows: critical thinking, logic, and analysis; to act carefully, open, and honest; capable of scientific communication.

The fact still encountered students who have misconceptions about the material of heat. This fact found by the researcher through pre-research activities. The pre-research had done on the student, identified by 29% of students understand the concept, 54% of students had misconceptions, 17% of students do not know the concept in answer questions [1].

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<http://science.conference.upi.edu/proceeding/index.php/ICMScE/issue/view/3> | ICMScE 2018 LKS is a device that consists of a series of questions and information designed to help students understanding complex ideas for the systematic arrangement. LKS can be developed into various forms of worksheets as needed. LKS can be a guide for learners to conduct an inquiry or problem- solving.

LKS can also be a workout guide the development of all aspects of learning in the form of experiments and demonstrations. The advantage of the LKS them allows teachers to deliver learning, guiding students to learn independently, learn to understand and do a written assignment [2]. In connection with the findings of the student learning outcomes, need to be reoriented in teaching physics, especially in the heat of material with the aim to reduce the level of student misconceptions.

One of the learning strategies that have proven effective for reducing misconceptions of

students is cognitive conflict strategy, because it has several advantages, namely: pay attention to preconception students; instill the concept of properly; and reducing the misconceptions effectively. This is consistent with the findings Duit [3] which states that the use of cognitive conflict strategy can significantly increase the understanding of physics concepts, think critically and to decrease miss-conception.

The cognitive conflict is induced in addressing misconceptions of students with a learning environment that can attract and emotionally challenged students to engage in it [4]. This study aims to describe the quality of worksheets (LKS) with Cognitive Conflict strategy based on the validity of LKS — to describe the effective use of worksheets with Cognitive Conflict in teaching and learning strategies based on RPP.

This research attempts 1) to describe the activities of students during a lecture using worksheets with cognitive conflict strategy, 2) to describe the learning outcomes of students during a lecture using worksheets with cognitive conflict strategy, 3) to describe the response of students during a lecture using worksheets with cognitive conflict strategy, and 4) to describe any obstacles faced by students during a lecture using worksheets with cognitive conflict strategy.

Method This research was implemented a research and development design. The study refers to the development of the 4-D models by Thiagarajan. This model consists of four development stages, they are: define, design, develop and disseminate which is adapted into a model 4-P, pendefinisian, perancangan, pengembangan, penyebaran. In this study, the development of instructional designs is only carried out up to develop phase.

The product produced in this development study is LKS with cognitive conflict strategy. However, the use of LKS with cognitive conflict is necessary to use others instructional designs such as lesson plans and assessment. The assessment of the instructional designs that have been developed is implemented in SMP Negeri 1 Lamongan in the first semester of 2017/2018 academic year.

The subjects of the study are worksheets and instructional design developed by researchers as well as 50 students of SMP Negeri 1 Lamongan on the seventh grade. The experimental design is used to investigate the development of LKS with cognitive conflict strategy atasan ftrudentmionceptiboutthe heat material. One group pretest-posttest design was designed to implement on a single group without a comparison group. In this design, the observation is conducted twice, i.e.

before the experiment (pre-test) and after the experiment (post-test). The analysis is done by the use of pre-test and post-test as a comparison. The comparison between

pre-test and post-test is assumed to be the effect of a given treatment, cognitive conflict strategy that is organized in a cooperative learning TGT. The design study can be described as follows. Figure 1.

One group pretest-posttest design X O 1 O 2 International Conference on Mathematics and Science Education of Universitas Pendidikan Indonesia Volume 3, 2018 | P-ISSN 2655-2361, E-ISSN 2655-3252 154

<http://science.conference.upi.edu/proceeding/index.php/ICMScE/issue/view/3> | ICMScE 2018 Description: O1 = A diagnostic test of initial misconceptions O2 = A diagnostic test of final misconception X = Cooperative learning TGT with cognitive conflict strategy. 3. Result and Discussion 3.1. Worksheets Validation Table 1.

Validation Results Student Worksheet No Aspects Considered Average Rating Score	Average Category	Reliability Validator 1	Validator 2	Validator 3
1 Format	3.33	3.33	3.33	3.33
2 Language	3.14	3.57	3.43	3.38
3 Content	3.5	3.13	3.38	3.25

The developed worksheet consists of; headline, tools and materials, formulation of the problem, hypothesis, variables, experimental procedures, analysis and conclusions (LKS experiment) and reflection to reflect material that has been studied.

Worksheets that have been developed are then validated by the three validators to be based on three aspects: aspects of the format, language aspects, and aspects of the contents of each of which averaged score of 3.33; 3.38; 3.25 and categorized as valid. This means that the worksheet that has been developed is feasible and can be used as a learning tool with some revisions, namely: in the early Worksheet must be displayed features of cognitive conflict so that students interested in joining the experiment, improve the use of words that are not appropriate, use the word consequent example of early using a stopwatch to the end is also a stopwatch, provide relevant training that has to do with cognitive conflict strategy and if possible it is suggested that the experimental activities and worksheets contain data presentation in the form of a table contained observations and conclusions. The blueprint of misconceptions and the misconception improvements on heat material can be written in Table 2. Table 2.

The blueprint of misconceptions and the misconception improvements on heat material

No Misconception	LKS Advisory	misconception improvements
1	Heat is needed to increase the heat is not affected by temperature and time	LKS 01 An experiment to prove that the mass and heat affect the required time.
2	Things that absorb the heat of the temperature rising	LKS 02 An experiment that shows changes in states of matter and objects that absorb the heat of the temperature may rise, possibly permanent.

3 Two objects mixed temperature is a combination of the temperature of the two objects LKS 03 An experiment to merge the two objects have different temperature International Conference on Mathematics and Science Education of Universitas Pendidikan Indonesia Volume 3, 2018 | P-ISSN 2655-2361, E-ISSN 2655-3252 155 <http://science.conference.upi.edu/proceeding/index.php/ICMScE/issue/view/3> | ICMScE 2018 3.2 Student learning outcomes Diagnostic tests are performed at the beginning(pretest)and late(post-test)learning.

Diagnostic tests beginning(pretest)aims to identify the concepts that experienced student misconceptions in the material heat and phase transition, while the end of the diagnostic test(posttest)aims to determine the effectiveness of cooperative learning TGT with cognitive conflict strategy in overcoming misconceptions. Reduction misconception is the effort made to change the misconception that the number of misconceptions reduced, by observing the results of diagnostic tests misconceptions beginning(pretest)with diagnostic test results late misconceptions after learning(post-test),can be presented in Table 3. Table 3.

Increasing Understanding and Reduction in student misconceptions No. Problem In Group Individually <g> Classification Pret est Postt est Pret est Post est CRIS Fraction True CRIS FractionT rue MIS (%) MIS 1 3.43 0,3 1 0,90 20 0 0,86 High 2 4.17 0.4 2 0.90 10 10 0.83 High 3 4.10 0 1.50 0.80 60 30 0.80 High 4 3.88 0.2 1.50 0.80 50 20 0.75 High 5 3.5 0.2 1 0.90 40 10 0.88 High 6 4 0.3 1.50 0.80 20 20 0.71 High 7 4.43 0.3 2 0.90 20 10 0.86 High 8 4 13 0.2 1 0.90 60 20 0.88 High 9 2.6 0.5 0 1 10 0 1 High 10 3.67 0.1

0 1 30 20 1 High Based on the analysis CRI as a group or as individuals from seven aspects misconceptions largely decreased.The percentage of students who have misconceptions on the analysis of individual CRI has decreased from 10% - 30%. There is a 10% reduction on the second aspect, is seen in a matter of numbers 7, 9 and 10.

The 20% decrease in contained in one aspect, which is seen in about 30% decline in the number 1. There are at numbers 3,4 and 5. The decline of 40% contained in 1 aspect, that is seen in the number of students 8. Declining miskonsesi good 10 - 40% is indicated by the effectiveness of cooperative learning TGT with cognitive conflict strategy applied .[3] Based on the sensitivity of items, each item can be said to be sensitive to measure learning effects because there is no negative sensitivity item.

This means that at the beginning of learning most students do not understand the scientific work process well, but after obtaining learning inquiry worksheet by using motion and forcing students to answer questions correctly.The demand for the development worksheet associated with the learning result received a score of 0.93 with the High Gain

score, in addition to the positive student response results interested in the learning process, resulting in an attitude of interest in causing the student to try to study the deeper material, and the material obtained can be easily understood and more embedded in students' memories.

Some of these factors lead to student learning outcomes. This is consistent with the suggestion that LKS with a cognitive conflict strategy can reduce the misconception of matter of heat. Based on the sensitivity table item, all items assessment test results are sensitive learning.

The question of the sensitive means of providing information that is the result of the assessment results, the lesson is oriented towards a cognitive conflict strategy. According to the results it says cognitive conflict strategy is better than conventional learning. [3] International Conference on Mathematics and Science Education of Universitas Pendidikan Indonesia Volume 3, 2018 | P-ISSN 2655-2361, E-ISSN 2655-3252 156 <http://science.conference.upi.edu/proceeding/index.php/ICMScE/issue/view/3> | ICMScE 2018 4.

Conclusion Research on the effectiveness of the use of students' science worksheets with cognitive conflict strategies on effective caloric materials can reduce misconceptions and resolve in learning outcomes in the cognitive domain has resulted in learning consisting of tools: (1) RPP, (2) LKS, (3) achievement tests. From the work of the worksheet, the spreadsheet worksheet with high gain value is 0.93. 5.

Acknowledgments The authors thank to the RISTEK-DIKTI, due to the funding of PDP-2018 for this work. 6. References [1] Alwan, Almahdi. (2011). " Misconception of heat and temperature among physics student ". *Procedia social and behavior sciences*. 12, pp 600-614. [2] Diber . (. "An itiiion ofeffi ofco nceptual change text- orentiron st's of gtconcepts" *Jnalof science education - proquest education journals*. 8. Pp. 46-52. [3] Duit, R. (2002).

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