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Development of Student Worksheet Characterized Think Pair Share in Learning of Natural Science in Elemtary School

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Abstract:- Student worksheets (LKPD) is the practical teaching material that contains a summary of the material and several practice questions. Student Worksheets is a set of activities that must be carried out by students to maximize understanding and the formation of primary skills according to the indicators of learning achievement. However, student worksheets is one of the significant media to be used in the learning process to support students in achieving learning goals. The best quality of student worksheetshas three requirements. There are didactic requirements, construction requirements, and technical requirements. Therefore, this study aims to produce a proper and legible student worksheets when applied in science learning in elementary schools with the Think-Pair-Share characteristic. The design of this research is Research and Development using the 4D model that is Define, Design, Develop, and Disseminate. The subject of this study used 6th-grade elementary school students by collecting student activity sheets in science subjects that discussed natural resources, environment, technology, and society. As a result, the feasibility test on the student worksheets that includes Content Truth, Linguistic, Presentation, and Graphic obtained Good Enough with the following scores of content truth (3), language (3), presentation (3,2), and graphics (2,9). Besides, there are differences in the results of the readability level of the study with the expectation that the actual material chosen is for the fourth grade but, the readability results show that discourse readability is at the fifth-grade level

Keywords:- *Student Worksheet (LKPD), Think Pair Share, Natural Science.*

I. INTRODUCTION

In this 21st century, there are many skills that need to be developed in the teaching and learning process, namely critical thinking skills, problem solving, metacognition, speaking skills, collaboration, innovation and creation, information literacy and various other skills. Students are required to have various skills in order to be ready to become successful people in life, especially skills in education. Education is a conscious effort made by humans to achieve life goals. Conscious effort is an effort made by humans for a purpose. Through education, humans prepare for survival. (Roesminingsih, 2015: 70).

In achieving educational goals, learning is needed that is in accordance with the child's development so that the material received by the child will be meaningful and become a provision for living life. Learning is more meaningful when children experience what they are learning. Some elementary schools still apply classical learning with a learning approach that focuses on learning concepts that are rote and teacher center. As a result, students become less interested in following lessons and there is no motivation from within themselves to try to understand what is being taught, which will affect learning outcomes.

During curriculum development, Olson (in Hamalik, 2008: 64) stated that the learning objectives were to prepare students to live in society. The school's function is to prepare students to face various problems in life, they are not prepared to face a distant future, 10 or 20 years from now, but to solve daily problems in their environment, at home and in society. Therefore, a good learning process is one that can teach students to deal with actual problems that occur everyday.

Permendikbud No. 21 of 2016 concerning Basic and Secondary Education Content Standards, with the aim of welcoming the golden generation in 2045, 21st century Graduates Competency Standards have been prepared. Material and competency levels are formulated in Content Standards. Content standards are adjusted to the national education goals, namely spiritual, social, knowledge and skills. One of the efforts to improve the quality of education in Indonesia is developing and perfecting the curriculum. For example, a curriculum that is being developed and its content is always being refined, namely the 2013 Curriculum, which is known to have a special purpose, is that students are expected to be useful for life in the community, nation and state by having a faithful, productive, creative and innovative attitude.

The application of learning in the field is not much different since the curriculum changes repeatedly, namely that educators in certain areas are still fixated on old or traditional learning methods such as the lecture method because it can be said that this method is a practical and simple method. A variety of existing methods should make it easier to try existing methods and adapt them to the abilities of students. From the students' point of view, they also still have a feeling of fear of not being able to in some

or one of the subjects, for example mathematics or English. Even when they have not received the material, they are full of negative thoughts about the subjects they do not like.

According to Prastowo (2014: 203) learning innovations carried out by educators are adjusted to the applicable curriculum according to the level of ability of students so that learning objectives and competency attainment for students can be achieved. According to Prastowo (2012: 6) compiling teaching materials is actually an easy matter, but the limitations of literature are the main cause of educatorsusing teaching materials that are ready to use. The ready-to-use teaching materials used are student activity sheets. According to Prastowo (2012), the risk of using ready-to-use teaching materials is very possible if the teaching materials they use are not contextual, unattractive, and not in accordance with the needs of students. One of the teaching materials purchased by educational institutions is the student activity sheet, abbreviated as LKPD. The Student Activity Sheet used is a ready-to-use Student Activity Sheet which contains learning materials, activities that students must carry out and questions, actually learning resources do not focus on books alone but can be from newspapers, people, the environment and others other. So it is hoped that the knowledge possessed by students is not limited to books.

In addition to using other learning resources, you must also develop existing student worksheet models, for example, it can be developed in think-pair-share (TPS) learning. The choice of think pair share model in this study is based on the characteristic that the think pair share type of cooperative learning is cooperative learning with simple steps so that it is suitable for use by educators who are just starting out using the cooperative learning model. By applying think pair share learning into student worksheets, researchers expect students to be more actively involved when learning. Students' activities outside of learning such as daydreaming, disturbing friends, and so on are expectedreplaced by an increase in activities such as independent work, discussion, and the courage to express their views.Think pair shareThis was developed by Lyman (1981), namely think-pair-share is an effective way to create an atmosphere of class discussion patterns. Excellencethink pair sharecompared to others, there is more emphasis on forming individual and group responsibilities. In this lesson, students present several questions and give time to think individually then think in pairs and finally report their findings and discuss the results in class.

According to Isjoni (2009: 23) the learning model is proven to be used in various subjects, including natural science. There are various kinds of cooperative learning, one of which isthink pair share. In the learning processthink pair shareIn this study, students know the essence of the material, then work on the assignment on the student worksheet given according to their own thoughts. Learningthink pair sharecan help students to express reasoning and reflect on the results of their thoughts. The application of this model can improve higher-order thinking skills (Eison, 2010). Three stages are heldthink pair sharecan help students solve problems that is when thinking. Students can share, exchange ideas and opinions to solve the problems they have in the pairing stage and at the last stage students can share through a discussion that requires a lot of thought processes as well as reflect on themselves with what they got during the discussion.

When students learn, students try to form concepts about what they are learning. This is as stated by Ibrahim (2012: 17) that when participants learn, they actually carry out activities to assemble the concepts they already have with new concepts, so that a web of concepts will occur in their thinking. One of the factors that causes students not to understand the concept is because one's mastery of concepts is not complete, simple and different. So we need a student-centered learning method, so that students can find information from a certain concept so that the information obtained by students is complete and able to work together with their friends. Learning sources or media are very diverse, they can be in the form of a classroom or school environment, books, student activity sheets and others.

Student worksheets are practical teaching materials because they contain a summary of the material and some practice questions for students.Student Activity Sheet is a sheet that contains tasks that must be done by students. Student Activity Sheet these are usually instructions and steps to complete a task. The material in the student worksheets is arranged step by step regularly so that students can follow it easily (Matutina, 2014). Student activity sheets can be viewed as a student guide used to carry out problem solving activities, and contain a set of activities that must be carried out by students to maximize understanding for the formation of basic abilities according to indicators of achievement of learning outcomes that must be taken (Trianto, 2015). In other words, student worksheets are an important medium to use in the learning process to support students in achieving learning goals.

As one of the media that supports learning activities, it is important to know the characteristics of a good student worksheet. Student worksheets are said to be of good quality if they meet the following requirements: (1) Didactic requirements mean that student worksheets must follow the principles of effective teaching and learning, namely paying attention to individual differences, emphasizing the process of finding concepts, having variations in stimuli through various media and activities students, can develop social, emotional, and aesthetic communication skills in students, and their learning experience is determined by the personal development of students and not by the teaching material. (2) Construction requirements, namely requirements regarding the use of language, sentences, and clarity that can be understood by students. (3) Technical requirements are related to the use of letters and their layout (Salirawati, 2004). The research objectives that will be achieved in this study are to produce student worksheets that are feasible and legible when applied in Natural Science learning in elementary schools.

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II. THEORETICAL FRAMEWORK

Student Worksheets

Majid stated (2013: 176) that student worksheets are sheets containing tasks that must be done by students. It is stressed much in the literature that if the worksheets are well designed, they can be a method to help shape the expected behavior changes in students, but it is also accepted that human mental development goes through certain stages in the process from birth to adulthood. Kurt (2002) states in his research that activity sheets are useful for students in terms of the need to gain knowledge themselves and also literature related to the material being studied.

The elements in the student worksheets include titles, study instructions, learning indicators, supporting information, work steps, and assessments (Yunitasari, 2013). Meanwhile, according to Widyantini (2013: 3), student worksheets as teaching materials have elements which include title, subject, semester, place, learning instructions, competencies to be achieved, indicators to be achieved by students, supporting information, tools and materials to complete assignments, work steps, and assessments. Based on these descriptions, the student worksheets to be created and developed contain elements of titles, subjects, study instructions, basic competencies, indicators, concept maps, tools and materials, work steps and assignments, and assessment.

Educators are urged to use modern student-centered teaching methods so that lessons can cover important points related to everyday life that students should like. Another goal is to increase student success and for scientists who wish to develop themselves in this field to be trained (Birbir, 1999 in Bakirci, 2011). One of these teaching methods is the use of activity sheets. The National Standard Agency (BSNP, 2012) states that there are several aspects that must be present in the development of student worksheets which include: content feasibility aspects, linguistic aspects, presentation aspects, and graphic aspects.

Think Pair Share

Arends (in Komalasari, 2010: 84) states that think pair share is an effective way to vary the atmosphere of class discussion patterns. Think pair sharedeveloped by Lyman and Kagan (1981), which can give students the opportunity to work alone and work with others. Think pair share emphasizes individual and group responsibility. In 1981 it was developed so that students experience fun learning activities and can work together in groups. Student participation will also increase (Huda, 2011).

In Nurhadi (2005), Frank Lyman (1981) think pair share is a cooperative type that can activate all students during the learning process and provide opportunities for collaboration between students. Meanwhile, Lie (2002: 56) stated that "think pair share is learning that gives students the opportunity to work alone and cooperate with others. There is another opinion according to Suyatno (2009: 54), namely that: "TPS is a model of cooperative learning which has explicitly defined procedures to give students more time to think deeply about what is explained or experienced (think, answer, and help each other. one another)". Some opinions regarding the notion of the think pair share model that have been stated,

This type of model is suitable if applied in schools that have students who come from various ethnicities because it will help reduce student reluctance. Here are some of the think pair share steps stated by Huda (2011) as follows: Students are divided into several groups with four or five members, then students get assignments from the teacher. Students work on the assignment of the teacher individually first, then in groups are further divided into pairs, and all pairs meet again in groups to share or share the results of the discussion with friends.

The success of implementing the model is also influenced by the interactions that students make, whether they listen to their friends who are presenting their ideas. The duration of their discussion also needs to be considered, for example multiple choice questions and essay questions. The two types of questions have different points and durations because the essay questions are more complex.

Fry Graphics

To analyze the readability of discourse, we need a measuring tool that is able to assess legibility properly and appropriately for use, one of which is a measuring tool in the form of a Fry graph formula (Hidayati, 2018). The Fry chart formula has long been used to assess legibility and is an easy-to-use readability measuring tool. Fry's Readability Formula is taken from the name of the person who created it, Edward Fry. This formula began to appear in public in 1977 in the magazine "Journal of Reading". Fry's readability formula takes 100 words in a discourse as a sample without paying attention to the length of the discourse. So, no matter how thick the number of pages of a book is, if you use this formula, someone only uses 100 words. This figure is considered representative according to Fry (Payani, et al, 2003, p. 44).

The benefit of using the Fry graph formula is to measure the readability of a discourse so that we will find out a person's ability to make discourse that is in accordance with the level of readability. After it is known the percentage of student success in making discourse that is in accordance with the level of readability, measurable and well-programmed improvements can be made which in the end make students' skills in making discourse increase.

III. RESEARCH METHOD

This type of research is research development (Research and Development) using the 4D model including Define, Design, Develop and Disseminate. This study develops student activity sheets in natural science subjects for fourth grade elementary school students with the subject of natural resources, environment, technology and society.

This study uses a research design that refers to the Thiagarajan model, Semmel (1974) known as the 4D model

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(four D models). The 4D model consists of 4 stages, namely: (1) Define; (2) Design; (3) Develop; and (4) Disseminate. For the needs of educators, the fourth stage, namely dissemination has not been carried out because the results of its development are still being applied in their own schools (Ibrahim, 2014: 118)

The definition stage is the initial stage in 4D development which aims to determine learning needs by analyzing the objectives and limitations of the main material to be developed. The first stage consists of a start-to-end analysis and concept analysis

At this stage the design is carried out after determining the learning objectives achieved by students. The design stage aims to prepare the initial form of the student activity sheet itself. In this stage, the preparation of tests is carried out, the selection of student activity sheet formats, and the initial design of the entire student activity sheet from the front cover to the back in the attachment.

The purpose of the development stage is to produce a revised draft II of the student activity sheet based on expert input and data obtained from trials. So it is expected that the student activity sheet developed meets the valid and reliable requirements. Validation of student activity sheets aims to obtain input and suggestions from competent validation experts to improve learning materials through student activity sheet activities (draft I) that have been produced at the planning stage. The validation results then obtained draft II.

IV. RESULT AND DISCUSSION

RESULTS

Before the research was carried out, the students' worksheets were first validated by an expert. Following are the results of validation by experts.The worksheet of students in this study is a tool used to help researchers technically carry out and complete research. The instrument in this study used a validation sheet filled in by a validator.

Table 1.The results of validation of student worksheets by experts

No.	Category	Score			Predicate
		V1	V2	Average	
1.	Truth of content	2.8	3,2	3.0	valid
2.	Language	2.9	3,1	3.0	valid
3.	Presentation	3,2	3,2	3,2	valid
4.	Graphics	2.8	3.0	2.9	valid

Source: Data processed by the author, 2020

To identify the level of conformity of the discourse readability of students' worksheets with the grade level in elementary schools, a measurement must be carried out first using the legibility formula. The teaching materials used by the teacher need to be adjusted by measuring the level of readability (Yasa, 2013). One of the easiest is to measure the level of readability is to use the legibility formula. There are several ways to measure the readability of discourse, one of which is by using the Fry Graph. The following is a description of the calculation of the number of sentences and syllables in the discourse on the student worksheets.

1) The first 100 words have 10 sentences added with the remaining words, namely 3/16 = 0.18, the result becomes 10.18. While the number of syllables is 264x0.6 = 158.4, rounded up to 158.
2) The second 100 words are 9 sentences. While the syllable is 221x0.6 = 132.6 rounded to 133.
3) The third 100 words have 9 sentences added to the word students, namely 6/16 = 0.37 the result becomes 9.37. while the number of syllables is 227x0.6 = 136.2 rounded to 136.

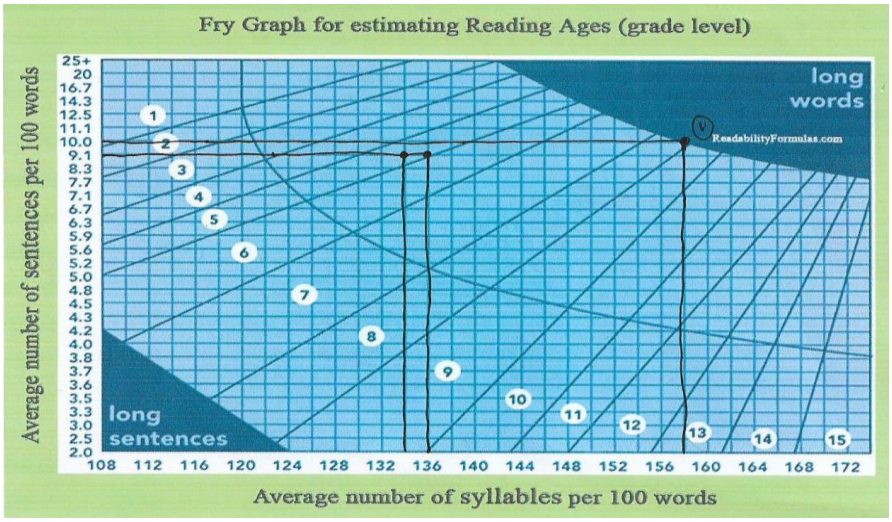

Figure 1.Fry Graph of Discourse Readability Calculation Results on Student Worksheets

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Table 2. Recapitulation of Discourse Readability of Student Worksheet

Discourse number	Number of syllables	Number of sentences	Determination of readability grade levels	Determination of the level of readability using the fry chart	information
1	158	10.18	4	8	Higher
2	133	9	4	5	Higher
3	136	9.37	4	5	Higher

Table 3. Results of Student Worksheet Discourse Readability Percentage

Readability level		
Lower	Corresponding	Higher
0	0	3
0%	0%	100%

DISCUSSION

The correctness of the material or the contents of the students' worksheets is determined by the suitability of the material with the Competency Standards, Basic Competencies, and Indicators and to see that the material in the student worksheets is appropriate or does not need to be seen from the readability of the material according to the students. Depdikbud (2013) states that the desired teaching and learning process is student-centered with a scientific approach and the teacher acts as a facilitator.

Didactic requirements can be viewed as fulfilled or not based on the validity of the correctness aspect of the content. Validation of the truth aspect of the content aims to assess the chemical concepts as outlined in the concept hierarchy steps on the subject of solubility and solubility products in students' worksheets. The average score of the validation aspects of the truth of the content is category 3, which is valid. Student worksheets that are designed are in accordance with the basic competencies that must be achieved. The substance of the material contained in the student worksheets is adjusted to the 2013 curriculum learning syllabus. This is in accordance with the opinion of Prastowo (2009) that a good student worksheet must have a match between the material and the competencies to be achieved. Student worksheets that are designed systematically and are in accordance with the stages of the concept hierarchy. Student worksheets can be used in helping students find concepts by sorting concepts from simple to complex concepts, so that students can carry out learning independently.

The general requirements for making student worksheets next are construction requirements. Construction requirements regulate the use of language, sentence structure, vocabulary, level of difficulty, and clarity, which in essence can be understood by the user, namely students. Construction requirements can be viewed as fulfilled or not based on the validity of the linguistic feasibility aspect. Validation of the feasibility of linguistic aspects aims to assess the level of readability or use of language on students' worksheets. The average score of the linguistic feasibility aspect is 3, which is valid. The designed student worksheets can be read quite well and have sufficiently clear information because they are prepared using good and correct Indonesian rules.

The general requirements for making student worksheets next are technical requirements that emphasize writing, images, and appearance. The technical requirements can be viewed as fulfilled or not based on the validity level of the presentation feasibility aspect and the graphic feasibility aspect. Validation of the presentation feasibility aspect aims to assess the quality of the presentation both in format and activity systematic. The average score of the validation aspect of presentation feasibility is 3.2, which is valid. The developed student worksheets provide sufficient space for students to express their opinions in doing the tasks contained in the student worksheets.

Validation of the feasibility of the graphic aspect aims to assess the accuracy of the layout, writing, pictures / photos, and designs on the student worksheets. The average score for the aspect of graphic feasibility is 2.9 which is valid. Student worksheets are equipped with supporting pictures / illustrations that aim to make it easier for students to understand the material. The results of the validation of the graphic aspects have met the feasibility aspects of the graphic feasibility contained in the National Education Standards Agency (2006), the size of the answer column is in accordance with the needs of the question work, the size of the image is harmonized with the writing on the student worksheet and there are colored pictures / illustrations for students don't get bored quickly.

The legibility aspect relates to terminology, clarity of language, and suitability of language with child development (Ruwanto, 2013). The legibility aspect is an aspect that often gets less attention from textbook writers. The use of complex terms and sentences is sometimes used by the writer without considering the age and level of cognition of the students. In addition, the texts used sometimes have a high level of complexity. This causes students to lack understanding of the material and information contained in reading materials. In fact, almost all material in textbooks is presented in the form of reading text. Moreover, the current curriculum 2013 is text based. This means that students are required to understand and produce legibility texts. Readability is closely related to the text or reading material.

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Fry charts are the result of efforts to simplify and streamline the techniques for determining the level of discourse readability. The result of the calculation of readability on the students' worksheets was 100% higher based on three times the discourse sampling on the student worksheets. For this reason, there needs to be a revision from the researcher so that it can be adjusted to the selected material, namely at the fourth grade level.

V. CONCLUSSION AND SUGGESTION

CONCLUSIONS

The Feasibility Test on the student worksheets which includes Content Truth, Language, Presentation and Graphic obtained the same results, namely Good Enough with the following scores of content truth (3), language (3), presentation (3,2) and graphics (2,9).

There are differences in the results of the readability level of the study with the expectation that the actual material chosen is for the fourth grade, but the readability results show that the readability of the discourse is at the fifth grade level.

SUGGESTIONS

Teachers are expected to be able to explore the use of student worksheets with think pair share characteristics effectively, such as by combining various learning methods in them, and involving other media that are relevant and in accordance with the conditions of the material, students, and the environment, so as to encourage critical thinking skills and learning outcomes. students. The strengths and weaknesses of this study are expected to be a reference material for teachers in using student worksheets in learning activities to be carried out.

It is hoped that from the results of the research students will be more active in learning, with various types of activities, especially activities in collaboration in study groups, identifying problems, solving problems, and communicating problem solving, so that students are more active in learning and gain experience and knowledge as provisions for facing school exams and real life.

The school is expected to examine the results of this research carefully so that they can be used as input and reference to improve the quality of learning in each class and subject through the use of student worksheets characterized by think pair share, so as to improve the main goals of education.

Other researchers are expected to maintain the strengths of this research, and fix or find solutions to the shortcomings of this study, so that better research results can be obtained regarding the use of worksheets of think-pair-share students.

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