*IOSR Journal of Research & Method in Education (IOSR-JRME)*
*e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 9, Issue 6 Ser. II. (Nov. - Dec .2019), PP 71-76*
*www.iosrjournals.org*

# The Development of Student worksheets Based on Contextual Teaching and Learning toOvercome the Problems in Teaching Mathematics at Elementary SchoolGrade 5 of Pringsewu

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***Abstract:*** *The aim of this research is to develop the Students worksheet based on CTL learning models and test it to the experts and students. The problems of this research are the number of students cannot master the material well, the teaching and learning is teacher centered, the students have lacks motivation, and students just have guidance book from library. Based on the result of checking the document found the effect of students failure was the material teaching. Because of it, researcher developed the students worksheet based CTL learning model. The method used was research and development. Based on the recapitulation results of the students' perception questionnaire towards the LKPD based CTL learning models developed, the total percentage obtained by 95% which stated that LKPD was perceived very well by students.*
***Key words****: CTL, LKPD, and Development.*

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Date of Submission: 18-11-2019 Date of acceptance: 04-12-2019

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## I. Background

Learning difficulties can also be interpreted as the child's inability to complete the tasks given by the teacher. According to Masroza (2013), the learning difficulty is a real disorder in children associated with general and special tasks, which are thought to be caused by neurological dysfunction, psychological processes and other causes so that children who have learning difficulties in a class show achievement low learning. The process of learning mathematics is not just a matter of calculation. According to Johnson and Myklebust (in Abdurrahman, 2003: 252), mathematics is a symbolic language whose practical function is to express quantitative relations and spaces while the theoretical function is to facilitate thinking. The field of mathematics studies taught in elementary schools includes three branches, namely arithmetic, algebra, and geometry.

Cockroft (in Abdurrahman, 2003: 253) argues that mathematics needs to be taught to students because (1) it is always used in all aspects of life; (2) all fields of study require appropriate mathematical skills; (3) is a strong, concise and clear means of communication; (4) can be used to present information in various ways; (5) increasing the ability to think logically, carefully, and spatial sense awareness; and (6) providing satisfaction with efforts to solve challenging problems. Various reasons for the need for schools to teach mathematics to students. Specific learning difficulties are a disorder in one or more of the basic psychological processes that include understanding and using spoken or written language. The disorder may manifest itself in the form of difficulty listening, thinking, speaking, reading, writing, spelling or counting. These limits include conditions such as perceptual disorders, brain injury, dyslexia, and developmental aphasia.

Based on the result of doing interview, the researcher found that difficulties in learning mathematics caused by teachers, for example: teachers are not able to choose or use teaching methods that are appropriate to the subject matter and depth of the material; lack of motivation and attention of the teacher towards students; improper ways of providing motivation, for example comparing individual student abilities (students with less ability always get negative assessments and vice versa); the teacher treats all students the same way that students actually have different abilities; the classroom atmosphere during teaching and learning activities took place tended to be rigid and serious so that students were less brave in expressing their opinions; the variation of language used by the teacher in conveying a concept is lacking, so that if students have difficulty capturing the teacher's delivery there will be a negative attitude.

Mathematics is known as a difficult subject because of its abstract, so that when learning in mathematics does not use appropriate and efficient learning methods for children, it will increasingly make math lessons disliked by children. Boring learning, such as the teacher only explains using the lecture method, does not use instructional media as an aid to children to understand the material, and exercises questions continuously without regard to the child having understood the concept correctly or not. For children who have difficulty learning mathematics, it will further make the child lag behind his friends who are able to follow the learning well.

Factors of difficulty learning mathematics not only come from within the child, but also from outside the child, one of which is a factor of the school environment, especially the learning process in the classroom. According to Sudjono (in Agustin, 2011), there are learning factors that lead to mathematical learning difficulties, namely the teacher is not able to choose or use teaching methods in accordance with the subject matter and depth of the material; lack of reward and motivation and teacher attention to students who are weak in mathematics; the teacher treats all students equally without regard to the background and character of students; the classroom atmosphere during teaching and learning activities took place tended to be rigid and serious so that students were less brave in expressing their opinions; the variation of language used by the teacher in conveying a concept is lacking, so that if students have difficulty capturing the teacher's delivery there will be a negative attitude.

In learning mathematics teachers should be able to explain the concepts of mathematics to students in simple language. If it is indeed necessary the teacher can use mathematical teaching aids, because with the help of teaching aids that are in accordance with the subject being taught, mathematical concepts will be more easily understood by students. Thus students will easily understand the basic idea of a concept or prove a concept. The teacher engages students in making generalizations. The teacher guides students to be able to make conclusions based on the characteristics that are specific to a given situation or problem. The deficiencies that are still present in students in making generalizations need to be responded to positively so that students are increasingly encouraged to be able to get the right answers.

Based on the results of observations by researchers of the mathematics learning process in class V, shows that the learning process of mathematics still tends to be centered on the teacher. When learning takes place, the teacher actively provides explanations while students only listen, take notes, and do the exercises. In mathematics learning that takes place at the school, teaching materials that are charged to the teacher to be delivered to students are very numerous. Therefore teachers tend to choose learning methods that emphasize how to complete the curriculum load on time rather than implementing learning methods that invite students to develop their abilities in learning mathematics. As a result of this learning is the difficulty of students in grasping the mathematical concepts taught by the teacher.

## II. Literature Review

In current learning, the teacher needs to actively involve students in the learning process. One way that teachers can engage students actively in the learning process is to use interesting media or teaching materials that can help students understand the concepts presented by the teacher. The intended teaching material can be in the form of textbooks, modules, LKPD and so on which are used as a means of conveying information. The use of teaching materials that are expected to help the effectiveness and fluency in the learning process so that learning objectives can be achieved optimally.

According to Prastowo (2011: 16) teaching materials are all forms of materials used to help the teacher or instructor in carrying out the learning process in class. Teaching material not only contains material about knowledge but also contains the skills and attitudes that students need to learn to achieve competency standards set by the government. One form or type of teaching materials that are often used by teachers in teaching classrooms is student worksheets (LKPD). According to Majid (2014: 371) Worksheets (LK) or task sheets (LT) are intended to trigger and help students carry out learning activities in order to master an understanding, skills and attitudes. Meanwhile according to Khotimah (2015) LKPD not only contains questions but a collection of activities in the learning process. So it can be concluded that the student worksheet is a sheet that contains material, descriptions, work steps, and exercises that must be done by students. Usually the worksheets of many students are monotonous and unattractive because there are no pictures and colors so that students' desire to learn becomes less especially in the geometry material. The teacher's task is to teach students or become learning agents for students. To teach students, the teacher should create and develop student worksheets that make students become eager to learn and arouse students' curiosity about what they see in the LKPD.

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According to Rachmawati (2012, p.1) culture is something that cannot be avoided in everyday life, because culture is a whole and comprehensive unit that applies in a community. This enables the existence of mathematical concepts embedded in cultural practices and recognizes that everyone develops a special way of doing mathematical activities commonly called ethno mathematics. By incorporating culture into mathematics learning students can understand mathematics learning easily and engrossed. Students can find out more about their own culture and students can integrate culture into geometry material. In addition to culture, students can think creatively and develop creativity because the forms or patterns on webbing are part of the material that is considered difficult by students so that by using woven-based LKPD will make it easier for students to understand geometry material.

By applying the contextual learning model, it is expected that there will be a change of atmosphere in learning, making students are more enthusiastic in learning, and make teachers more creative in implementing learning plans that have been prepared previously. The contextual model can also make the learning process more meaningful, interesting, easy to understand, and can improve learning outcomes in accordance with the specified KKM. To solve the problems that have been formulated, the application of contextual learning models (CTL) to the style material is addressed to facilitate students in understanding the contents of the learning undertaken, understand the material delivered with experience in learning, and the learning process will be liked by students without making students feel bored. This contextual learning model is a learning plan done by involving learning material in the real world, and experiences experienced by students.

In international scientific journals conducted by Kokom (2012) entitled "The Effects of Contextual Learning in Civic Education on Civic Students Skill "that obtained the influence of contextual learning on the ability of student citizenship, with correlation of 0.48 when compared with the correlation co efficient the table is in the moderate category and for the relationship Contextual teaching regression lines on abilities citizenship shows R squared of 0.23which means it has an effect on ability citizenship is 23%. BesidesKokom, researcher also found the research from Riska. Based on previous research conducted by Wijayanti (2015) in his thesis applying a CTL learning Models obtained student learning outcomes with completeness 90.62%. This can prove that CTL learning models can improve results student learning. Then become a strong reason for researchers to apply effective learning models and can improve student learning outcomes.

The benefits of developing the contextual teaching and learning LKPD based on this model for students are that it can be used to increase student creativity in geometry material, and to add references to learning resources in the form of LKPD that can be used in the learning process. For teachers, it can be used as an alternative teaching material and will facilitate teachers in implementing the learning process and guiding students in improving student creativity.

## III. Research Methodology

This type of research is in the form of research and development (research and development). According to Borg and Gall (2013: 407) research "research and development is a research method used to produce certain products. The development model used is the ADDIE model which consists of 5 stages, namely analysis, design, development, implementation, and evaluation. According to Branch (2009: 2) ADDIE development model is one of the most effective tools to produce a product, because the ADDIE development model is a guideline framework for very complex situations, so it is very appropriate to develop educational products.

The research subjects in this development are two validators consisting of the material expert test validator, the learning design expert test validator and the media, and the target users of this product are Grade V of elementary students. The type of data taken in this study is in the form of qualitative data and quantitative data. Qualitative data were obtained from the results of the validator of media experts, material experts, responses from teachers in the field of mathematics studies, and the results of the questionnaire students' perceptions of learning media that have been made, while quantitative were obtained from student learning outcomes through post-test (final test).

The development stage, there are several things that are developed namely the contents of the worksheet of these students are adjusted to the material and learning objectives. The LKPD that has been developed is validated by an expert or a team of experts consisting of material experts and design experts so that it meets the acceptable quality criteria, then the next step is formative evaluation. According to Branch (2009: 122) formative evaluation is a data collection process used to revise prior to implementation. According to Branch (2009: 123) there are 3 stages in formative evaluation, namely individual trials on 1 teacher, small group trials consisting of 8 students, and large group trials involving 22 students.

The implementation phase is the step of implementing the product from the product being developed. According to Branch (2009: 133) at the product implementation stage that has been tested is applied in real situations with real teaching. The evaluation phase is carried out in several stages, namely the evaluation carried out by media experts and material experts through the product validation process, then revising the product

based on assessments and suggestions from learning design experts and the media and material experts. Branch (2009: 154) says that there are 3 evaluation levels in the ADDIE model, namely: level 1: perception, level 2: Knowledge (Learning) and level 3: Implementation (Performance). In the research development of this teaching material, researchers only carry out until the level 2 stage of the ADDIE evaluation model, namely level 1 (perception) and level 2 (knowledge).

The instrument used in the study was a questionnaire and test of learning outcomes. According to Moleong (2013: 163) research instruments are tools or facilities used by researchers in collecting. Open questionnaire is given to learning design experts, media experts and material experts when validated by experts, while closed questionnaires are given on individual trials to see teacher responses, small group trials and large groups to see students' responses to learning the product. Data analysis of this research was conducted using descriptive statistics. The analysis includes validation analysis of research instruments and mathematics LKPD, as well as the effectiveness of LKPD mathematics.

## IV. Result and Discussion

The results of this development research are (1) a student worksheet based on CTL (2) assessment of material content and LKPD design by LKPD material experts and design experts, (3) student assessment to LKPD that has been made, (4) students' perceptions or responses to the use of Jambi culture-based LKPD obtained from a questionnaire that has been validated by an instrument expert, (5) student learning outcomes towards the use of Jambi culture-based LKPD by giving a post-test to fifth grade students Prengsewu Elementary School. The use of LKPD uses the ADDIE development model.

LKPD was developed based on the Contextual Teaching and Learning (CTL) learning model. In LKPD given pictures and information from these images and students are asked to observe, try to rearrange and redraw the patterns that exist in LKPD to find the properties, types of flat shapes and find the circumference and area of the flat lot. According to Toman, et al (2013) students can construct what they hear and see into a concept and connect the concepts obtained in school with everyday life, learning will be more meaningful. From this process students experience a meaningful learning process and LKPD affects the learning process.

Based on the results of the analysis phase, the initial conditions of the development of mathematics LKPD were generated. The work gap analysis obtained is that there are only a few students who have a high interest in learning mathematics, the lack of active students in learning mathematics and the low mathematics scores of students in school, the use of instructional media that cannot be implemented due to the limitations of school technology so that it is not possible to use the learning media, and the lack of teaching materials used by teachers in teaching. After knowing the gaps that occur then a research objective was arranged which was to develop a Jambi culture-based mathematics LKPD on geometry of a flat figure to increase student creativity.

According to Branch (2009: 60) the general procedures performed at the design stage are holding or making things that are needed, compiling evaluations, formative designs, and producing test strategies. What is needed in this study is to create a story board, formative evaluation and design revision. The design phase or LKPD design has been carried out several steps including setting a work plan by preparing a design and research schedule, a team of validator experts, teaching material specifications to determine the material to be designed in LKPD, for the material taken is flat building material. After the work plan has been prepared the steps that have been taken are to hold and make teaching materials in the form of a mathematics worksheet based CTL learning model.

After the LKPD is revised in accordance with the suggestions and comments of the expert team, a formative evaluation is carried out to see the effectiveness of the LKPD. According to Branch (2009: 123) there are 3 special stages in formative evaluation, namely individual trials, small group trials and field trials. Individual trial of one mathematics teacher and the teacher's response was very positive stating that LKPD was appropriate to be used in the learning process. Then the product trial in a small group consisting of 8 students and a large group trial consisting of 22 students. In small group trials and large group trials the students got responses after participating in the learning process stating that the CTL mathematics based CTL model that was developed well and responded very positively by students without any revision of LKPD.

Small group trials and large group trials were also carried out pre-test and post-test to see an increase in students 'mathematical representation ability, the results obtained by students' mathematical representation ability on flat material increased from the criteria of not being sufficient to representation and representation. For the gain test an increase in mathematical representation ability is seen in the following table:

**Table 1.1.** Gain Test Results for Increasing Mathematical Representation Ability

| **Stages** | **Gain Test** | **Evidence** |
|---|---|---|
| Small group trial | 0,7 | High |
| Large group trials | 0,8 | High |

After the development phase with individual trials and group trials, the next stage is the researcher conducting on teaching mathematics LKPD based CTL learning model in the actual class or implementation process. According to Branch (2009: 133) at the product implementation stage that has been tested is applied in real situations with real teaching by using LKPD based on CTL learning models.

Before the learning process is carried out, the students are given a test of mathematical representation ability as a pre-test for students to find out the students' initial mathematical representation ability. The results of this initial representation ability will be compared with the final mathematical representation ability of students obtained from the post-test results. At the end of the learning process students were also given a questionnaire of perception in which this questionnaire was used to see students' perceptions of the material teaching developed. Based on the recapitulation results of the students' perception questionnaire towards theLKPD based CTL learning models developed, the total percentage obtained by 95% which stated that LKPD was perceived very well by students. This was analyzed by using a gain score test through pre-test and post-test for flat wake material. The gain test results can be presented in the following table:

**Table 2.** Gain Test Results for Increasing Mathematical Representation Ability

| **Stages** | **Gain Test** | **Evidence** |
|---|---|---|
| Implementation | 0,7 | High |

Thus it can be concluded that the mathematics teaching worksheet based on the CTL learning model has been valid based on an evaluation of the development and is effective in learning mathematics because it is perceived positively by students and students' mathematical representation ability increases. Evaluations that are intended to improve LKPD at each stage, this evaluation is called formative evaluation. In order to obtain an LKPD that is suitable for use in the learning process. Based on the evaluation, it was obtained that LKPD was based on a valid CTL learning model according to the validator expert team, responded with a positive response by mathematics teacher at SD 1 grade 5 Pringsewu Lampung, assessed by positive responses by students on the LKPD product trial so that LKPD did not experience revisions for the implementation phase. At this stage the results of students 'perceptions were very good towards the CTL learning model developed by CTL, and the results of students' mathematical representation ability increased from those that were not representations to enough representations to very representations. Based on the results obtained, it can be concluded that the LKPD mathematics based CTL learning model is effective against learning on geometry material.

## V. Conclusion

The development of LKPD on the geometry material based on the CTL learning model was carried out with several stages, namely analyze, design, development, implementation, evaluation. The analysis conducted is curriculum analysis, validation of work gaps, setting goals, analysis of students' needs and characteristics, analysis of available resources and work plans. The procedure carried out at the design stage is to make or make what is needed, formative evaluation, and revision of the design. The results obtained are LKPD suitable for use. Then LKPD was tested on one of the mathematics teachers, 8 students of class V. At the implementation stage involved 30 students or one class, namely class V SD 1 Pringssewu. Based on the evaluation, it was obtained that LKPD was based on a valid CTL learning model according to the validator expert team, responded with a positive response by the mathematics subject teacher, assessed by a positive response by students on the LKPD product trial so that the LKPD did not undergo a revision for the implementation phase. The quality of Jambi culture-based LKPD can be seen from 3 aspects namely valid, practical and effective. Validation was obtained from the validator team who stated that the LKPD was appropriate to be used. The level of practicality is seen from the validator and the results of the analysis of student activity observation sheets. The effectiveness of LKPD seen from the positive response of students and student learning outcomes tests. In this study it was seen that student learning outcomes on geometry material flat rise increased.

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Berta NikenDianingrum.“The Development of Student worksheets Based on Contextual Teaching and Learning to Overcome the Problems in Teaching Mathematics at Elementary School Grade 5 of Pringsewu." IOSR Journal of Research & Method in Education (IOSR-JRME) , vol. 9, no. 6, 2019, pp. 71-76.