

Development of TSTS Cooperative Model Learning Devices in the Science Study Content, Theme 7, Class IV SD

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ABSTRACT

The purpose of this study is to develop learning tools based on the Two Stay Two Stray type of cooperative learning model (TSTS) on the content of science lessons, theme 7, grade IV elementary school in Jembrana Regency. The intended learning device consists of; 1). Syllabus, 2). Learning implementation plan and student worksheet. The research design used in this study is Research development or often known as development research, using the development model in this study, namely 4D (four-D). The stages of the 4D development model are divided into 4, namely Define, Design, Develop, and Disseminate. The subjects in this study were learning experts, science knowledge experts, and 2 fourth grade teachers from different elementary schools in Jembrana Regency. The object of the research used is the development of learning tools in the form of syllabus, learning implementation plan, and student worksheets based on TSTS type of cooperative learning models. The average overall toolkit is syllabus = 4.13, learning implementation plan = 4.22, student worksheets = 4.41. The conversion of values based on the Five Scale Benchmark Assessment gets a Very Good category so that the learning tool is based on the TSTS type of cooperative learning model which goes through a trial process of 4 experts and declared Valid.

Keywords: Cooperative Learning model TSTS, Learning Tools, Science

1. INTRODUCTION

Science is a basic subject that must be mastered by students at every level of education including primary school education. Lecturer Working Group IPA PGSD (2018) stated that Natural Sciences (IPA) are often referred to as natural sciences. Science or IPA which in English is called natural science or science for short is the science that studies the symptoms of the universe including the earth. The process aspect is essentially science is a method for obtaining knowledge in a certain way through research, observation, observation. [1], [2] states that science is the study of natural phenomena and everything in nature including the earth. This opinion is also in line with the opinion of [3] which states that science is a knowledge of natural systematics which contains natural phenomena and natural events which not

only contain facts but contain scientific attitudes and scientific methods. Therefore, Science subjects are subjects that must be taught in elementary schools so that students are able to recognize the environment and think critically in solving problems faced in everyday life [4].

Equipping someone to think critically, problem-solving, metacognitive skills, communication, collaboration, innovation and creation, information literacy, and various other skills are highly reflected in life in the 21st century [5]. In this century, it requires a variety of skills that must be mastered, therefore it is hoped that education can prepare students to master these various skills so that they become good and right individuals [6]. To prepare students in the wider community, 4C needs to be instilled [7] states that 4C is a description of 1) Critical Thinking Skills are students' skills in problem-solving and how students find solutions

to this. 2) Creative Thinking Skills are skills that use an approach to solve a problem. 3) Communication skills are skills to express new thoughts, ideas, knowledge, thoughts, and information. 4) Collaboration skills are skills to work together effectively and responsibly.

Cultivating 4C skills in students requires a design of learning activities that focus on students as the subject of learning centers [8]. The design of learning activities that is good and correct is very much determined by adequate and quality learning tools [9]. [10] state that learning devices are tools or materials used by teachers to carry out the learning process. This statement is in line with [11] which states that learning devices are all tools and materials used by teachers in carrying out the learning process. The quality of the device to be used will determine the quality of learning. To produce quality tools, the preparation of learning tools must be mature [12]. The conclusion of several theories that have been put forward is that the understanding of learning devices is a tool or resource used by teachers to deliver learning material.

The tools and materials in the learning tools include syllabus, lesson plans, student worksheets. RPP is a planning program that is prepared and used as a guide for every activity of the learning process [13]. PP is described from the syllabus to direct students in achieving basic competencies [14]. [15] states that the components of RPP consist of school identity, subject identity, class/semester, subject matter, time allocation, learning objectives, KD and indicators, learning materials, learning methods, learning media, resources, steps. learning, assessment of learning outcomes. [16] state that LKPD is sheets containing assignments to test students' abilities in understanding the material that has been delivered by the teacher. LKPD can be used as a tool or means of support for the achievement of a lesson plan designed by the teacher. The implementation of the learning process and the assessment of the learning process are part of the learning device so that the learning device is able to increase student learning activities.

Increasing the participation of students in the learning process requires quality learning tools and is in line with 4C skills [17]. Organizing learning activities to increase student participation must be combined with a learning model that makes students active in the learning process [18]. The Two Stay Two Stray type of cooperative learning model is a group learning model consisting of 4 people per group [19]. [20] stated that the objective of this TSTS type of cooperative learning model is that students are faced with listening to what their friends say when they are visiting, which indirectly the students will be brought to listen to what is said by the group members who host it.

[21] states that the TSTS (Two Stay Two Stray) type of cooperative learning model is one of the student-centered learning models. This learning model can

mobilize all students to be active when the learning process takes place. [22] state the advantages of this learning model, namely being able to create an active learning atmosphere and share information with study groups. So that the material provided by the teacher to students will be quickly understood through group learning and get satisfying learning results. [23] states that the Two Stay Two Stray cooperative learning model involves students from planning, implementing to presenting their work in front of their friends. The TSTS type of cooperative learning model is very suitable to be applied to support the learning process, including the science lesson content of students. This model provides mental reinforcement for students in understanding the content of the material to be made, as well as discussing ways to solve problems given by the teacher. This assumption is supported by relevant research from [24] on the TSTS type cooperative learning model. The results of students' science learning in the experimental class that was taught using the TSTS type of learning model showed that most of the students' scores tended to be high because 1) students felt happier because they were invited to discuss the learning process, 2) students became more active in answering the questions given by the teacher because in the discussion students can discuss with their group friends, 3) student learning becomes more meaningful, 4) interest in learning and student perspective increases.

The learning activities that have been described have not occurred in some elementary schools in the Jembrana district, especially those in the village, which are still categorized as less innovative. Based on the results of an online interview using the WhatsApp application, some elementary school teachers in Jembrana Regency stated that learning tools already exist but the content of these learning tools is not optimal, especially in science subjects. Some teachers still use learning tools that access the internet, as well as LKPD which are still rarely made in learning activities.

The problems that have been raised require appropriate solutions and handling. The solution that must be applied to these problems is to improve the quality of the learning tools and the learning model used. Improving the quality of learning tools includes syllabus, lesson plans, and LKPD combined with the TSTS cooperative learning model, as well as directing students to work together with groups to complete assignments from the LKPD given by the teacher. According to [25]. "Student worksheets are sheets containing tasks that must be done by students". This LKPD contains instructions for the steps that must be taken by students to do a task and plays a role in helping students integrate their physical and mental activities during the learning process. Meanwhile, [26] explains that "Student Worksheet (LKPD) is a learning resource that can be developed by educators as facilitators in learning activities. The compiled LKPD can be designed and

developed by the conditions and situations of learning activities to be faced. "So that the role of the teacher as a facilitator runs according to its function. Based on the explanation above, development research was carried out entitled Development of Two Stay Two Stray Cooperative Model Learning Tools on the Content of Science Lessons, Theme 7 Class IV SD in Jembrana Regency.

2. METHOD

The research design used in this is research development or often known as development research. Development research is research that aims to develop existing products and produce new products. The products used in this study consisted of a syllabus, lesson plan (RPP), and student worksheets (LKPD). The development model used in this research is 4D (four-D). This development model was used by [27]. The stages of the 4D development model are divided into 4, namely Define, Design, Develop (development) and Disseminate (disseminate). At the dissemination stage, it cannot be carried out because several obstacles are used as references, namely, the emergency related to the Covid-19 pandemic, the target objects used are elementary school students who were closed due to the Covid-19 pandemic, limited costs used in multiplying the products used such as syllabus, RPP and LKPD and the limited time that will be used to disseminate the products used in this study. The development research procedure is divided into three stages, namely as follows. 1) Define (definition) is the stage to define or define needs in research development. Determination of needs or conditions in the form of a product to be developed. 2) Design (design) the purpose of this stage is a way to develop products that will be made in the form of learning tool formats such as syllabus, lesson plans, and more efficient and innovative LKPD which will be developed in full. The stages are carried out such as. a) Analyze competency standards (SK) and basic competence (KD) for class IV theme 7 in the field of scientific knowledge, then determine indicators. b) Determining the learning design that will be used by determining the syntax of the learning model used, namely the TSTS cooperative learning model so that it becomes standard and consistent. c) Designing a syllabus and lesson plans that are adapted to the syntax of the learning model used, namely the TSTS cooperative learning model, and designing LKPD according to the TSTS cooperative learning model in which there are assignment materials to be done in groups. 3) Develop (development), this stage is the implementation stage of the previously designed product. The purpose of this stage is to produce a product that is developed in the form of a syllabus, lesson plans, and student worksheet. The next step is the preparation of learning tools in the form of a syllabus, RPP, and LKPD based on TSTS cooperative learning, validating, and testing the product

on the specified subject. Some of the activities carried out at the development stage are as follows. a) Preparation of products in the form of syllabus, RPP, and LKPD. Before carrying out the preparation of the product made, it is necessary to ascertain the feasibility of the product as seen from the design stage. The results of the feasibility test on the product design indicate that the product is made to be implemented. Product development in the form of a syllabus, RPP, and LKPD is prepared based on learning in the field of science theme 7, which contains 6 learning activities related to the field of science. The preparation of the designed products is done by reviewing the results of the analysis at the define stage. As well as the results of the initial design of the product in the development stage (design). The orientation of the learning model used is the TSTS cooperative learning model which is carried out specifically on the component of the product steps being developed. b) Validation or assessment. At this stage, it is carried out to obtain or produce a product that is suitable for use in theory or practice. This activity involves the experts or experts concerned in their field to test and provide input and suggestions that must be improved. The results of the validation from these experts will be used as a reference to the success of a product being developed.

The series of product trials that will be carried out in this development research with the TSTS type cooperative learning model is divided into 4 stages, namely as follows. 1) In the design of the TSTS cooperative learning model-based learning device trial design, it is made to provide an overview of the process of testing the level of feasibility or validity of the device. The level of validity of the tools to be developed is obtained after the draft has been assessed by experts (expert judgment). Experts who were targeted in the validity test were experts in the field of science, learning assessment experts, and 2 teachers from 2 different schools. 2) The subject of the research in question is the person who is used as the source of data or information from the research carried out so that it gets valid, practical, and effective results. The subjects in this study were learning experts, science knowledge experts, and 2 grade IV teachers from different elementary schools in Jembrana Regency. The object of the research used was the development of learning tools in the form of syllabus, lesson plans, and student worksheets based on the TSTS cooperative learning model. 3) The type of data that will be collected after going through the test data product results from a predetermined expert review. The data obtained will be grouped into 2 types of data, namely quantitative data and qualitative data. Quantitative data is data in the form of scores given by experts related to the devices being tested, while qualitative data contains input and suggestions from experts. 4) The data collection method used in this study is a questionnaire method. [28] explains that the questionnaire method is an assessment by submitting statements to respondents. The data to be

collected is based on the type of data obtained. Data that are grouped according to the type of data is divided into 2, namely quantitative and qualitative data. This development research uses two data analysis techniques used, while the analysis techniques used are qualitative descriptive analysis techniques and quantitative analysis techniques. The explanation of the two techniques is as follows. a) Qualitative descriptive analysis technique is used to process data from the review results of several predetermined experts [29]. This analysis technique is used in classifying input and suggestions from experts in providing an assessment of the product being made. The results of this analysis are to be used in revising or correcting deficiencies in the product being developed. b) Quantitative descriptive analysis techniques are used to process data in the form of numbers or values obtained through assessment sheets [30]. The data collection instrument used in this study was designed to measure the object to be observed. A research instrument is a tool used to obtain or collect research data, as a step in finding the results or conclusions of research with the criteria for making good instruments [31]. The instrument used in this study used an assessment sheet instrument that would be tested by several predetermined experts. Based on the data collection instrument that will be validated by experts, the following activities are carried out to ensure the validity of the instrument. 1). Making a lattice table for the learning device product instruments used, namely the syllabus, lesson plans, and student worksheet, 2). Consultation with the supervisor regarding the content of the instruments made, 3). Writing instruments, 4). Conducting content validity tests by experts who have been determined, designing the device research instrument begins with designing the instrument grid. The instrument grid for each product includes the syllabus, RPP, and LKPD. 1) syllabus instrument grid consists of Completeness by Regulation of The Minister of Education and Culture Number 22 of 2016, a compendium of components by Regulation of The Minister of Education and Culture Number 22 of 2016, conformity of basic competencies with Regulation of The Minister of Education and Culture Number 24 of 2016, the main material by specified basic competencies, learning activities designed to follow the steps of the TSTS cooperative learning model, learning activities designed according to basic competencies, assessments designed to measure basic competency attainment, assessments designed to measure the achievement of the TSTS cooperative learning model, planned time allocation according to the subject matter, learning resources according to the main subject, the use of grammar according to EYD, the sentences used are simple and easy to understand. 2) The lattice of the learning implementation plan (RPP) consists of: completeness in accordance with Regulation of The Minister of Education and Culture Number 22 of 2016, the clutter of components in accordance with Regulation of The Minister of Education and Culture Number 22 of

2016, the main material according to the determined basic competencies, time allocation according to the designed needs for the achievement of basic competencies, the formulation of learning objectives based on indicators of competency achievement, basic competencies in accordance with what is in the syllabus, the formulation of indicators in accordance with basic competencies, the formulation of indicators using operational verbs, the learning materials containing (concepts, facts, principles and procedures) relevant to what the indicators have been formulated, the learning method used is adjusted to the learning model used, namely the discussion and question and answer method, the learning resources used are adjusted to the learning objectives formulated (such as student books, the classroom environment) which are used as objects, the suitability of steps ah learning using the TSTS type cooperative learning model, the complexity of the learning steps, the accuracy in choosing the assessment technique, the accuracy in choosing the form and the assessment instrument, the use of EYD based sentences, the sentences are easy to understand. 3) The lattice of the student worksheet instrument (LKPD) consists of: the completeness of the LKPD identity, the clarity of the LKPD work instructions, the learning objectives that are adjusted to the RPP, the suitability of the learning material with the learning objectives contained in the LKPD, the activities in the LKPD adjusted to the learning model used, namely the TSTS cooperative learning model, the ease in the steps of the learner, the planned time allocation according to the subject matter, the language used is easy to understand and the use of grammar is by EYD.

Instruments that have been designed to be able to collect data need to be tested first to ensure the quality of the instrument by testing its validity level. In this study, the instrument test used was the content validity test. For this research to be valid, an expert test was conducted to obtain an assessment. The results of the trial by experts that had been determined were analyzed to obtain content validity using the Gregory formula and cross-tabulations were made. The validity test of this research instrument used 2 lecturers as experts, namely Mrs. I Gusti Ayu Tri Agustiana, S.Pd., M.Pd. and Mrs. Ni Nyoman Rediani, S.Pd, M.Pd.

3. RESULT AND DISCUSSION

The results of this study are the product of learning tools consisting of a syllabus, lesson plan (RPP), and student worksheets (LKPD) based on the TSTS Type Cooperative Learning Model on Class IV Science Subject Content, Theme 7 SD in Jembrana Regency.

The results of product development in the study were developed based on the 4D (four-D) model stages. The stages of the 4D development model are divided into 4, namely Define, at this stage the definition or

determination of needs in research development is carried out, at this stage an end analysis, student analysis, concept analysis, task analysis and formulation of learning objectives are carried out [32].

Design stage (planning), at this stage the design and loading of the prototype are carried out. The research design made consisted of a syllabus, lesson plans, and student worksheet based on information that had been previously obtained [33].

The Develop stage (development), at this stage the development of learning devices will be tested so that they get valid results. Some of the developments that will be described are the syllabus, RPP, and LKPD. The purpose of this stage is to produce a product that is developed in the form of a syllabus, lesson plans, and student worksheet. The next step is the preparation of learning tools in the form of a syllabus, RPP, and LKPD based on TSTS cooperative learning, validating, and testing products on the specified subject [34].

Disseminate stage (spread). At the dissemination stage, it cannot be carried out because there are several

Table 1 Average Score Validity Test

Number	RPP	LKPD	Syllabus
1	4.12	4.56	4.13
2	4.15	4.44	
3	4.18	4.22	
4	4.26	4.44	
5	4.24	4.47	
6	4.35	4.28	
Average Overall Validity Test Scores	4.22	4.40	4.13

Table 2 Classification of Five Scale PAP Predicates

Average Score	Predicate Classification
$4,01 < X \leq 5,01$	Very Good
$3,34 < X \leq 4,01$	Good
$2,66 < X \leq 3,34$	Enough
$1,99 < X \leq 2,66$	Not Good
$0,99 < X \leq 1,99$	Very Bad

Seen in table 1 the overall average of the syllabus, RPP, and LKPD tools, namely syllabus = 4.13, RPP = 4.22, LKPD = 4.40, while in Table 2 the value conversion based on the Five Scale Assessment Reference Benchmark (PAP) gets the category Very Good (VG).

All learning tools which include the syllabus, lesson plans, and LKPD average scores obtained have been converted to (PAP) scale five and are declared to have the Very Good (VG) category. This is because learning tools are made and developed through the 4D (four-D) model stage. According to [27], the stages of the 4D model are divided into 4, namely Define (definition), Design (planning), Develop (development), and Disseminate (dissemination). At the dissemination stage, it was not

obstacles that are used as references, namely the emergency situation related to the Covid-19 pandemic, the target objects used are elementary school students who were closed due to the covid-19 pandemic, limited costs used in multiplying the products used such as syllabus, RPP and LKPD and the limited time that will be used to disseminate the products used in this study. The learning device is tested by 4 experts then the results are analyzed to obtain an average score. average. The data analysis was divided into 2, namely quantitative and qualitative data analysis. Quantitative data is data in the form of scores given by experts related to the device being tested, while qualitative data contains input and suggestions from experts to maximize the products made so that they get the desired product goals.

The results of the analysis of the average score of the validation test results of the learning tools which include the syllabus, lesson plans, and student worksheets that have been converted to (PAP) scale five can be seen in Table 1 and Table 2.

carried out due to the Covid-19 pandemic situation and limited costs in multiplying the products being made. The defined stage consists of 5 stages of analysis, namely: 1). end (beginning-end) analysis, student analysis, concept analysis, task analysis, and formulation of learning objectives. Based on the 5 analyzes in the define stage, it describes that to find information related to gaps that exist in the subject and object to be studied, such as problems faced by teachers in designing learning tools. The purpose of the design stage is a way to develop a product that will be made in the form of a learning tool format such as a more efficient and innovative syllabus, lesson plan, and LKPD which will be developed in full. The stages are carried out such as 1). analyze competency

standards (SK) and basic competence (KD) for class IV Theme 7 on science subject content, then determine indicators, 2). determining the learning design that will be used by determining the syntax of the learning model used, namely the TSTS cooperative learning model so that it becomes standard and consistent, 3). designing a syllabus and lesson plans that are adapted to the syntax of the learning model used, namely the cooperative learning model of the TSTS type and designing the LKPD according to the TSTS cooperative learning model in which there are assignment materials to be done in a group. The development stage is the implementation stage of the product that was previously designed. The purpose of this stage is to produce a product that is developed in the form of a syllabus, lesson plans, and student worksheet. The next step is the preparation of learning tools in the form of a syllabus, RPP, and LKPD based on TSTS cooperative learning, validating, and testing the product on the specified subject. The results of the trials tested by 4 experts who had been determined so that the data were obtained were then analyzed to obtain an average score. The data analysis was divided into 2, namely quantitative and qualitative data analysis. Quantitative data is data in the form of scores given by experts related to the device being tested, while qualitative data contains input and suggestions from experts to maximize the products made so that they get the desired product goals. [35] stated that a device is declared valid if it meets the specified criteria, namely obtaining a minimum value of 3 from a validity scale of 5, therefore the device is suitable for use.

4. CONCLUSION

Based on the results of research and discussion, get the average value of learning tools based on the TSTS type of cooperative learning model on the subject matter of Science 7 Theme, Class IV SD in Jembrana Regency. The scores obtained from the learning tools that were converted to the five-scale standard of reference for assessment (PAP), all of the learning tools were categorized as Very Good (SB). Suggestions given based on the results of this study in the context of developing learning tools based on the TSTS type of cooperative learning model in science subject matter are 1) the existence of supporting adequate learning activities such as syllabus, lesson plans, and LKPD based on the TSTS type cooperative learning model in science lesson content so that teachers can use these tools so as to maximize learning activities. 2) The principal should facilitate the teacher in making learning tools so that they can make a positive contribution to establishing policies in the preparation of learning tools. 3) For other researchers, the development of learning tools based on the TSTS type of cooperative learning model can be used as a reference in dealing with problems in learning. Results are the main part of scientific articles, containing: clean results without data analysis process, hypothesis testing results.

Results can be presented in tables or graphs, to clarify the results verbally.

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