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Development of Think-Pair-Share (Tps) Model Based Learning Tools for Global Warming Materials

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A B S T R A C T

The aim of this research is to develope are cooperative model-based learning tools of TPS type with Quizizz learning media on global warming materials for high school XI students. The materials are consisting of Learning Implementation Plan (RPP), Student Worksheet (LKPD), and Learning Outcome Test. This type of research is Research and Development (R&D) with 4D model design. The research instruments used are rpp validation assessment sheets, LKPD, and Learning Results Tests used by validators to assess learning devices. The data analysis in this study uses descriptive analysis, by calculating the validity score of each learning device indicator. Based on the results of the analysis of validity data, the Learning Implementation Plan (RPP) gets an average score of 3.07 (high), the Student Worksheet (LKPD) gets an average score of 3.16 (high) and the Learning Results Test gets an average score of 3.13 (high). Thus, tps-type cooperative model-based learning devices with Quizizz learning media are declared valid and feasible for use in global warming materials in grade XI SMA.

1. Introduction

Education is the most important factor in a person's life, because it can distinguish a person's ability to think. People who have the ability to think broadly can survive in an era that is growing rapidly and are able to improve science and technology. Education is also a process in order to influence students so that they can adapt as well as possible to their environment. One of the factors that determine the progress of education is what the teacher does in learning in the classroom. Teachers are expected to be able to develop professionalism in teaching students in their function as mediators and facilitators in learning as reported by Argam (2019).

Learning is a process of interaction between teachers and students. Learning can also be interpreted as a process of interaction between students and educators and

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learning resources in a learning environment. Learning activities are designed to provide learning experiences that involve mental and physical processes through interaction in order to achieve basic competencies. The learning process is one of the stages that determine the success of student learning. Efforts to improve the quality of education and teaching can be carried out on various components such as: students, teachers, learning indicators, learning content, learning methods, learning media, and evaluation. The teacher as a mediator and facilitator in learning must master these components as reported by Yusoff (2020).

The education management system must be oriented towards optimizing the intelligence of students. This can be achieved through national education reform, namely by changing the curriculum. Currently, the 2013 curriculum is being developed as a guideline for implementing education in order to achieve national education goals. Changes to the 2013 curriculum emphasize more on the wisdom of students (student centers) which are oriented towards attitudes and skills as reported by Wijayanti (2014).

Physics subjects require practice to understand physics concepts, solve and discover why and how events occur. Students will find it easier to apply physics problems in everyday life by understanding physics concepts. In the learning process, students often think that physics is difficult and scary, so students are less interested in taking physics lessons. From the results of research conducted by Wardiman Djojonegoro, as quoted by Dipdip Herdianata, it was found that physics was considered the most difficult subject in school, so students did not like it as reported by Misdalina (2020).

Facts in the field show that the low results of learning physics in schools are the use of learning models that are not suitable for learning, the lack of students' conceptual understanding of the material being taught, the erroneous assumptions or assumptions of teachers who think that knowledge can be transferred in its entirety from the teacher's mind. -teacher to the minds of learners. With these assumptions, the teacher focuses on learning physics on efforts to convey or transfer as much knowledge about physics as possible to students. However, in current developments, teachers are demanded that their duties and roles are no longer as a provider of information and knowledge transfer (transmission of knowledge), but as a learning booster so that students can independently construct their knowledge through activities such as problem solving and communication as reported by Hajian (2019).

Learning with cooperative learning methods, group discussion models are usually considered less effective because not all students in a particular group play an active role in discovering concepts and building their own knowledge, one particular group tends to be dominated by one or two students and other students just imitate it. . Possible solutions that can be the answer to these problems are cooperative learning with the Think-Pair-Share model (in pairs). According to Junior (2020) Cooperative learning of the Think-Pair-Share model (in pairs) is one way to create student collaboration in groups, as well as giving students more

time to think, answer, and help each other. This technique gives students the opportunity to work alone as well as in collaboration with others.

Quizizz learning media is one of the online-based learning media that can be used in the learning process. Quizizz is presented in the form of a game or a fun game in answering questions given by the teacher in the learning process. Quizizz can be a learning medium used by teachers to create a learning atmosphere that stimulates students' enthusiasm for learning because Quizizz is designed in a "quiz game" concept that encourages students to be able to compete fairly in getting the best results as the first winner in this game so that they can increase motivation to learn. "Game-based learning has good potential to be used as an effective learning medium because it can stimulate visual and verbal components" (Agarwal, 2019). From the explanation that has been described above, the authors want to conduct research on the development of learning tools that aim to develop learning tools based on the Think-Pair-Share (TPS) model with Quizizz learning media on Global Warming Material for Class XI SMA.

2. Methodology

The type of research used in this research is Research and Development Research and Development (R & D), with the design of the Define, Design, Development, and Dissemination (4D) development model. This study aims to produce TPS-type cooperative-based physics learning devices with Quizizz learning media for class XI SMA on global warming material so that the developed learning tools are valid. At the define stage defines the learning requirements, namely the 2013 curriculum. The design stage designs Think-Pair-Share (TPS) based learning tools with Quizizz learning media. While the development stage is carried out by expert validation and validation tests. The subject of this study was a TPS-type cooperative learning device with the developed Quizizz learning media, including Learning Implementation Plans (RPP), Student Worksheets (LKPD), and Learning Outcomes Tests.

The research data is the result of validation of the validity of the learning device consisting of lesson plans, worksheets, and learning outcomes tests. Instruments for the validity of the learning tools consisted of the RPP Assessment Sheet, the LKPD Assessment Sheet and the Learning Outcomes Test Assessment Sheet as reported by Zulhelmi (2007).

The data collection technique used in this study was to provide learning tools that had been prepared along with validation assessment sheets to the validator to be assessed. Experts or validators provide an assessment consisting of opinions and suggestions for improvement as well as a score for each item. The data analysis technique in this study was carried out using descriptive analysis, in which the validity score of each learning device validity indicator was calculated. The validity of the learning device is determined by the score of the validator results. Data analysis of validation results is carried out by calculating the validity of learning tools consisting of lesson plans, worksheets, and learning achievement

tests by determining the categories and scores for the validation instrument answers filled in by the validator using a Likert scale as shown in Table 1.

Table 1. Score of the Validation Instrument Rating (Sugiyono, 2019)

No	Category	Score
1	Very High	4
2	High	3
3	Small	2
4	Very Small	1

The next step is to find the average value of aspects, items and validation instrumentation categories using the formula:

$$R_i = \frac{V_{ji}}{n} \quad (1)$$

Information:

R_i = Average item i

V_{ji} = Score of the results of the validator's assessment of the th item

n = Number of Items/Aspects

To determine the average category of indicators of a learning device is obtained by matching the total average using a Likert scale as in table 2.

Table 2. Category of Assessment of Validation Instruments (Sugiyono, 2019)

No	Average Score	Category
1.	$3{,}25 \leq \bar{x} \leq 4{,}00$	Very High
2.	$2{,}50 \leq \bar{x} < 3{,}25$	High
3.	$1{,}75 \leq \bar{x} < 2{,}50$	Small
4.	$1{,}00 \leq \bar{x} < 1{,}75$	Very Small

The criteria for drawing conclusions from this research were carried out by means that each component of the learning device assessment was declared valid and said to be in the category of high and very high validity if each statement on the indicator obtained a score of less than 4 and greater than 3 with categories according to table 1.

3. Results and Discussion

This study uses a 4D development model which includes Define, Design, Development, and Dissemination. In this study, researchers only used 3 stages, namely define, design, and development. The design stage is designing Think-Pair-Share (TPS) based learning tools with Quizizz learning media. While the development stage is carried out by expert validation and validation tests. The subject of this study was a TPS-type cooperative learning device with the developed Quizizz learning media, including Learning Implementation Plans (RPP), Student Worksheets (LKPD), and Learning Outcomes Tests.

From the results of collecting validity scores carried out by the validator, the results of the assessment of physics learning devices based on the TPS cooperative model with Quizizz learning media are obtained as shown in Table 3.

Table 3. Assessment Results of Model-Based Physics Learning Devices Cooperative TPS type with Quizizz Learning Media

No	Learning Media	Validation 1			Validation 2		
		$\bar{x}$	Category	Criteria Validation	$\bar{x}$	Category	Criteria Validation
1.	RPP	2,48	R	T.Valid	3,07	T	Valid
2.	LKPD	2,46	R	T.Valid	3,16	T	Valid
3.	Learning Outcome Test	2,47	R	T.Valid	3,13	T	Valid

Based on table 3, learning tools consisting of RPP, LKPD and Learning Outcomes Tests are declared valid with a high average category and are suitable for use as learning tools for global warming in class XI SMA. The results of the validation of each learning device according to the indicators and aspects will be described in Table 4.

Table 4. RPP Validation Results

No	Assessment Instrument RPP	Validation 1			Validation 2		
		$\bar{x}$	Category	Criteria Validation	$\bar{x}$	Category	Criteria Validation
1.	KD suitability, goals and time allocation	2,16	R	T.Valid	3,00	T	Valid
2.	Learning objectives	2,43	R	T.Valid	3,00	T	Valid
3.	Learning materials	2,51	R	T.Valid	3,09	T	Valid
4.	Learning methods	3,32	S.T	Valid	3,32	S.T	Valid
5.	Instructional Media	2,43	R	T.Valid	3,15	T	Valid
6.	Learning Resources	2,34	R	T.Valid	3,04	T	Valid
7.	Learning Activities	2,68	T	Valid	3,06	T	Valid
8.	Evaluation	2,00	R	T.Valid	3,00	T	Valid

Based on Table 4, it can be seen that the assessment given by the three validators to the lesson plan developed shows an average validation score of 1, namely that there are still those that are not valid in the low category. Then an improvement was made to validation 2 and declared valid with the high and very high categories. For LKPD there are 12 assessment indicators assessed by the validator. LKPD validation results can be seen in Table 5.

Based on Table 5, it can be seen that the assessment given by the three validators to the LKPD that has been developed shows an average score in validation 1, that is, some are still not valid, namely the average is below 2.50. Then in validation 2 it was declared valid with the high and very high categories. Whereas in the Learning Outcomes Test there are 7 assessment indicators assessed by the validator, the results of the Learning Outcomes Test validation can be seen in Table 6.

Table 5. LKPD Validation Results

No	Assessment Indicator LKPD	Validation 1			Validation 2		
		$\bar{x}$	Category	Criteria Validation	$\bar{x}$	Category	Criteria Validation
1.	LKPD activities based on Think–Pair-Share (TPS) are presented according to the syllabus and lesson plans	2,68	T	Valid	3,00	T	Valid
2.	Think–Pair-Share (TPS) based LKPD structure	2,34	R	T.Valid	3,00	T	Valid
3.	Activities according to indicators and learning objectives	2,34	R	T.Valid	3,00	T	Valid
4.	Loading the steps to find what to achieve	2,34	R	T.Valid	3,67	S.T	Valid
5.	The images used are in accordance with the topic	3,34	S.T	Valid	3,34	S.T	Valid
6.	Provide activities for the development of social relations	2,68	T	Valid	3,00	T	Valid
7.	The sentences used are simple and clear	2,34	R	T.Valid	3,34	S.T	Valid
8.	Questions have been structured to be answered by processing information	2,34	R	T.Valid	3,00	T	Valid
9.	There is sufficient space to write down the answers	2,34	R	T.Valid	3,34	S.T	Valid
10.	Letters for topics, with information or instructions are clearly different	2,34	R	T.Valid	3,00	T	Valid
11.	Help students develop thinking skills	2,00	R	T.Valid	3,00	T	Valid
12.	Train students to develop social skills	2,68	T	Valid	3,34	S.T	Valid

Based on Table 6, it can be seen that the assessment given by the three validators on the Learning Outcomes Test which was developed in validation 2 was declared valid in the high and very high categories. The development research carried out in this study is research to develop learning tools in the form of Learning Implementation Plans (RPP), Student Worksheets (LKPD), and Physics Learning Outcomes Test questions on global warming material based on TPS type cooperative models with Quizizz learning media for students class XI high school. The researcher uses the 4D development model by Thiagarajan (in Sugiyono, 2019) which consists of 4 stages, namely define (definition), design (planning), development (development), and dissemination (dissemination). However, this research was only carried out until the development stage.

Table 6. Results of Learning Outcomes Test Validation

No	Assessment Indicator	Validation 1			Validation 2		
		$\bar{x}$	Category	Criteria Validation	$\bar{x}$	Category	Criteria Validation
1.	Compatibility of question indicators with KD	2,00	R	T.Valid	3,00	T	Valid
2.	The suitability of the question indicators with the learning objectives	2,68	T	Valid	3,00	T	Valid
3.	The sentences used are easy for students to understand	2,68	T	S.Valid	3,00	T	Valid
4.	The meaning of the question is explained well	2,34	R	T.Valid	3,34	S.T	Valid
5.	The questions are not related to each other	3,34	S.T	Valid	3,34	S.T	Valid
6.	The language used is communicative, straightforward, and unambiguous	2,34	R	T.Valid	3,34	S.T	Valid
7.	The subject matter is formulated specifically, clearly, and firmly	2,00	R	T.Valid	3,00	T	Valid

Based on data analysis by the validator on physics learning materials for global warming material based on the TPS cooperative model with Quizizz learning media for class XI SMA, the average total validity for lesson plans is 3.08 in the high category, the average total validity for LKPD is 3.17 in the high category, and the average total validity of the Learning Outcomes Test is 3.14 in the high category. Learning tools that have been validated as a whole are declared valid so that they are suitable for use as learning tools in schools. The learning tools in this study are:

Learning Implementation Plan (RPP)

The Learning Implementation Plan (RPP) was developed from the syllabus to direct students' learning activities in an effort to achieve Basic Competence (KD). RPP is a face-to-face learning activity plan for one or more meetings. Each teacher is required to make and compile a complete and systematic lesson plan so that learning takes place fun, interactive and systematic. RPP is prepared based on KD which is carried out in one meeting or more according to the learning material to be taught.

In this research, TPS cooperative-based lesson plans have been developed with Quizizz learning media which consists of two lesson plans. RPP Meeting 1 on the greenhouse effect and RPP Meeting 2 contains material on global warming. Based on the results of the RPP validation shown in Table 4, it can be concluded that the RPP received an assessment from the validator with a high category so that it can be said to be valid and suitable for use as a guide in carrying out learning material on global warming.

Student Worksheets (LKPD)

LKPD is a collection of sheets containing student activities that allow students to carry out investigations or problem solving of the issues being studied. LKPD functions as a study guide for students and makes it easier for students and teachers in the learning process. According to Dermawati et al., (2019), LKPD contains tools, materials and work procedures. So far, the use of LKPD is a way to help students to be more active in constructing their knowledge according to the demands of the 2013 Curriculum (Masu'di, 2021). According to Husni et al., (2020), LKPD is a teaching material that can reduce the teacher-centered paradigm to become student-centered so that students will be more active.

In this study consists of two LKPD. LKPD 01 is about the greenhouse effect and LKPD 02 is about global warming (Figure 1). Based on the results of the LKPD validation shown in Table 5, it can be concluded that the LKPD gets an assessment from the validator in the high and very high categories so that it can be said to be valid and feasible to use. Thus, of course, valid LKPD can support the teaching and learning process for the better and make students more active in learning activities.

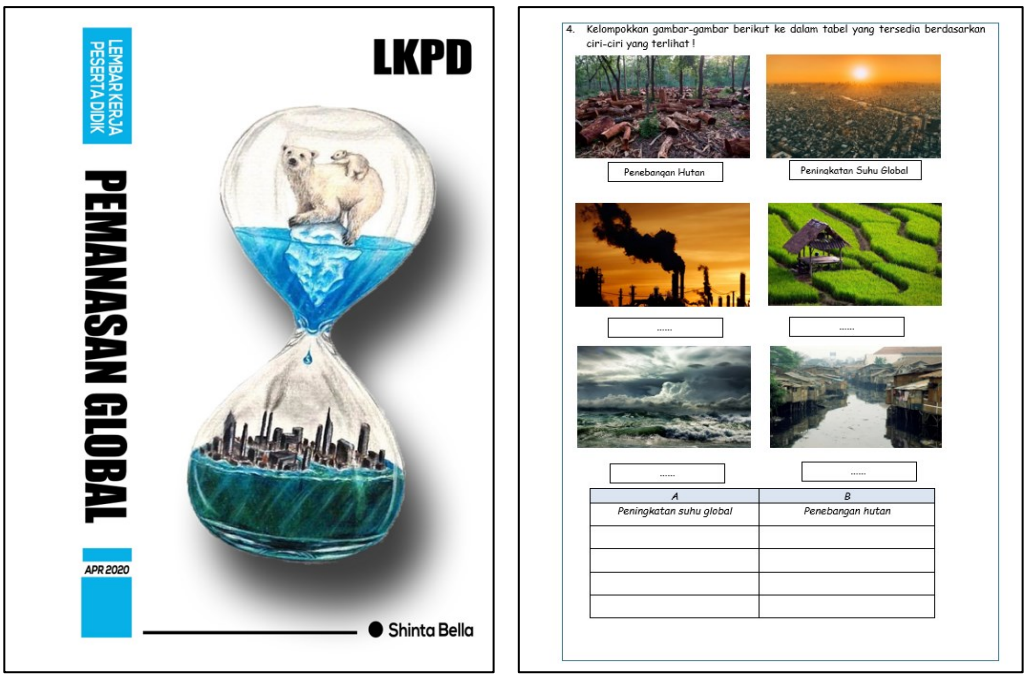

Figure 1. Sample LKPD form, One of the Contents of the LKPD that was Created

Learning Outcome Test

In essence, student learning outcomes are changes covering the cognitive, affective, and psychomotor areas that students get from the learning process (Khan et al., 2020). Learning outcomes can be seen from changes in behavior obtained from learning after experiencing learning activities. Learning outcomes are directed actions in completing learning tasks. Anderson in Schunk et al.,

(2020) divides the cognitive area into six levels with different aspects. The six levels are remembering (C1), understanding (C2), applying (C3), analyzing (C4), assessing (C5) and creating (C6).

In this study, a 10-item Learning Outcomes Test was developed, in the form of multiple choice questions with cognitive aspects (C1-C4). It can be seen in Table 6, based on the results of the Learning Outcomes Test validation, it can be concluded that the Learning Outcomes Test obtained an assessment from the validator in the high category and very high so that it can be said to be valid. Based on data from the results of the validation of learning tools consisting of lesson plans, worksheets, and learning outcomes tests developed, they meet the very high category, so that the learning tools developed meet valid qualifications. Thus the lesson devices in the form of lesson plans, LKPD, and Learning Outcomes Tests can be used in the learning process in class XI high school on global warming material

4. Conclusion

Based on the results of research, data analysis, and discussion, it was found that learning tools consisting of Learning Implementation Plans (RPP), Student Worksheets (LKPD) and Learning Outcomes Tests were each classified as valid with a high category. Thus it can be concluded that the learning tools on global warming material are valid based on the average validation instrument items, the average aspects of the validation instruments and the average total validation so that they are feasible to be used as learning tools that can be used in the teaching and learning process.

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